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Volume 9 No. 12B

Technical Information Service, Oak Ridge, Tennessee

NUCLEAR SCIENCE ABSTRACTS

Volume 9 January 15 — June 30, 1955 No. 12B

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INTRODUCTION

Nuclear Science Abstracts (NSA) is issued twice a month by the Atomic Energy Commission (AEC). It is intended primarily to serve scientists and engineers working within the Atomic Energy Project, by abstracting as completely and as promptly as possible the literature of nuclear science and engineering. It covers not only unclassified and declassified research reports of the AEC and its contractors, but also material in its field of interest which appears in unpublished research reports of government agencies, universities, and industrial research establishments, and in the technical and scientific journals.

DECLASSIFICATION

The issuance of these abstracts does not constitute authority for declassification of any reports.

INDEXES

Nuclear Science Abstracts is indexed by personal and corporate author, by subject, and by report number. Annual index issues are prepared for each volume. A cumulated index to Volumes 1-4 was issued as Volume 4, No. 24B, Dec. 30, 1950, covering authors, subjects, nuclides, and report numbers. The 24th number of Volumes 5, 6, and 7 contains indexes covering the individual volumes, as well as a cumulated Numerical Index of Reports covering *Abstracts of Declassified Documents (ADD)*, Vols. 1 and 2, and the previously issued *NSA* volumes. Issue 24A of Vol. 8 contains author and subject indexes and a Numerical Index of Reports for items abstracted in Vol. 8. A separate publication (TID-4000, Cumulated List of Available Unclassified AEC Reports) which will contain a Numerical Index of Reports cumulated through Vol. 8 of *NSA* is in preparation.

Each issue of Vol. 9 (1955) contains an Author Index and a Numerical Index of Reports for abstracts in that issue as well as new availability information on reports abstracted previously. Subject and author indexes, as well as a cumulation of the Numerical Index of Reports, are issued as a supplement to the 12th issue. The 24th issue will be the annual index for the volume.

Nuclear Science Abstracts carries in issues 6B, 12B, 18B, and 24B lists of New Nuclear Data in which experimental results are displayed in tabular form and arranged by element and isotope, with each entry including a reference. The listing in No. 24B is the annual cumulation. The lists of New Nuclear Data are compiled by the Nuclear Data Group of the National Research Council, Washington 25, D. C. The New Nuclear Data items are also supplied by this group on 3 × 5 in. cards for \$20.00 a year domestic and about \$30.00 a year foreign (air mail postage included).

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Nuclear Science Abstracts is available in single copies (regular issues are 25 cents each; index issues are priced according to size; plus postage on all issues for foreign orders) or by subscription (\$6.00 a year domestic; \$8.00 a year foreign) from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

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In general, only requesters associated with the U. S. Atomic Energy Program, and with other government agencies, can obtain reports from the AEC or its contractors. Requesters not officially sponsored should not seek to obtain reports from the Commission or its contractors. Such requesters should obtain reports as described below.

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For information concerning the availability of USAEC reports see the paragraph under INDEXES.

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Translations. The complete series (NSF-tr) of National Science Foundation translations is available at the depository libraries. Other translations from Russian are available at the Scientific Translation Center, Library of Congress, Washington 25, D. C., and translations from other foreign languages are available at the SLA Translation Pool, John Crerar Library, Chicago, Ill. The availability of translations from these centers is indicated in the Numerical Index of Reports.

Non-AEC Reports. The AEC cannot undertake to supply reports prepared by organizations not under contract to the AEC, except to official requesters. Others should request such reports from the issuing agency indicated in the descriptive cataloging of the report, and in the Numerical Index. Foreign reports, and reports designated by an NP number, are not available from the AEC, except to official requesters. Requests directed to the originators for NP reports should give the author and title, since NP numbers are applied to such reports by the AEC for its convenience only, and may not be known to the issuing agency.

British reports (AERE series, etc.) are available for examination at the special depositories of British reports, and, if a price is indicated in the "Availability" column of the Numerical Index of Reports, they are available for purchase from British Information Services, 30 Rockefeller Plaza, New York, N. Y.

Canadian reports (AECL series) are available at the AEC depository libraries, and, if a price is indicated in the "Availability" column of the Numerical Index of Reports, they are available for purchase from Scientific Document Distribution Office, Atomic Energy of Canada Ltd., Chalk River, Ontario, Canada. Inquiries about other Canadian reports should be made to the National Research Council, Information Services, Ottawa, Ontario, Canada.

General Information on Location of Reports. If the searcher knows the report number, he should look in the Numerical Index of Reports of *NSA*, Vol. 7, No. 24A, Dec. 31, 1953, or in the supplements in later *NSA* issues. If the searcher does not know the report number, searching is aided by the annual or cumulated subject and author indexes. The indexes refer to an abstract from which the report number may be obtained, and the information regarding availability can then be obtained from the Numerical Index of Reports. Declassified reports numbered MDDC and AECD through 2023 are indexed by subject and author in the separate *Declassified Documents Cumulated Index*, and their abstracts appear in *ADD*, the forerunner to *NSA*. These publications, as well as the first five volumes of *NSA*, are not available for sale but may be consulted at the AEC depository libraries.

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Canadian reports (AECL series) are available at the AEC depository libraries listed above.

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OF BIOPHYSICS
JOHNS HOPKINS UNIV
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THOMASON PAUL F
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THOMPSON BOYD W
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THORWART [illegible]
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TOOR E W
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TOPP A C
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TOPPER L
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TORDA T P
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TORIBARA T Y
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TOVE P A
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UNIV OF PENNA
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TYAPKIN A A
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UTLAUT WILLIAM J
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UZHIK G V
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VAIL C R
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VAISMAN I A
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VALCKX F P G
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VAUGHAN W
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INST
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VISWANATHAN ARUNACHALA
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WARD A H
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WARD E
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WARD M
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WASHINGTON RESEARCH LABS
NATIONAL CANNERS
ASSOCIATION D C
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POWER DIV
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CORP
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LABS
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WEVER H
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WHALIN E A JR
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WHALLEY E
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NUCLEAR SCIENCE ABSTRACTS

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NUMERICAL INDEX OF REPORTS

Numerical Index of Official Atomic Energy Reports with Indications of Their Availability.

This Numerical Index of Reports is divided into two parts: Part I—all USAEC reports abstracted or listed in *Nuclear Science Abstracts (NSA)*, Vol. 9, Nos. 1-12A; Part II—all non-USAEC reports abstracted or listed in *NSA*, Vol. 9, Nos. 1-12A. In addition to the report number and corresponding abstract number, the Index includes a brief statement regarding the availability of each USAEC report listed; this information is given for non-USAEC reports also when it is available.

Nuclear Science Abstracts, Vol. 7, No. 24A, Dec. 31, 1953, includes a cumulated Numerical Index of Reports covering all reports in *Abstracts of Declassified Documents (ADD)* and in *NSA*, Vols. 1-7, together with the latest availability information as of Dec. 31, 1953. Information concerning reports abstracted in *NSA*, Vol. 8, appears in *NSA*, Vol. 8, No. 24A, Dec. 31, 1954. A completely cumulated listing covering all volumes of *ADD* and *NSA* through Vol. 8 is issued as a separate publication, TID-4000. Each issue of *NSA*, Vol. 9 (1955), contains information concerning reports abstracted in that issue. A complete annual cumulation will appear in No. 24A (Dec. 31, 1955). In addition, each issue contains new information concerning the availability of reports previously abstracted.

In order to help identify the originator of each series of non-AEC reports, a significant word has been placed in parentheses beside the code. No parenthetical word is shown for series of reports issued by the USAEC. Information regarding the location and acquisition of non-AEC reports appears in the Introduction to this issue.

The Introduction to this issue also contains location and acquisition information to supplement the following explanations of the various types of entries found in the "Availability" column:

ENTRY	EXPLANATION
NSA	Nuclear Science Abstracts
ADD	Abstracts of Declassified Documents, the predecessor of NSA.
NNES	National Nuclear Energy Series, published by the McGraw-Hill Book Co.
Sale Price	If USAEC report, available from the Office of Technical Services. If British report, available from British Information Services. If Canadian report, available from Atomic Energy of Canada Ltd.
Sale Price (GPO)	USAEC or other report for sale through the U. S. Government Printing Office.
In ...	Reports contained in published books.
Reference (Condensed)	Thesis published in condensed form.
Dep.	USAEC reports available at the All Depository Libraries as full-size copy.
Dep.(mc)	USAEC reports available at the All Depository Libraries only in microcard form. Full-size copies of such reports can be obtained on a loan basis by any All Depository Library on request to the Technical Information Service.
JCL	Available from John Crerar Library, Chicago, Ill.
LC	Available from Library of Congress, Washington, D. C.
Dep.(mc); Ind. Dep.	A report held by the other All Depository Libraries in microcard form only is available in full-size copies at the Industrial Depository Libraries.
Journal (without citation)	Report has been submitted to the journal for publication.
Journal (with specific citation)	Report has been published as cited.
USGS	Available from the U. S. Geological Survey, Washington 25, D. C.
NRC	Available from National Research Council of Canada, Ottawa, Ontario, Canada.
JENER	Available from the Librarian, Joint Establishment for Nuclear Energy Research, Kjeller per Lillerstrom, Norway.

ASSIGNED CODE DESIGNATIONS

MDDC–To declassified reports released by the Manhattan Engineer District and by the Atomic Energy Commission before March 1, 1948.

AECD–To declassified reports released by the Atomic Energy Commission after February 29, 1948 (appeared in April 15, *Nuclear Science Abstracts*).

AECU–To unclassified reports originating within the Atomic Energy Project. (Subsequent to AECU-871, this code is applied only to reports carrying no other recognized code designation.)

NP– A file designation assigned by the Technical Information Service (TIS) to nonproject reports whose codes, if present, are not practical for TIS use.

Other code designations below are assigned to unclassified reports by the originating installations.

PART I

Report	Abstract	Availability
ACCO		
16	9-159	Dep.(mc)
ACRH		
2	9-3748	Dep.
AEC-tr		
367	9-1930	See TT-167
794	9-1376	See BNL-L-62(p159-62)
979	9-915	See TT-237
1289	9-1748	See TT-300
1321	9-1556	Henry Brutcher (Trans. No. 2769), Altadena, Calif.
1459	9-886	See TT-343
1953	9-3307	JCL
1961	9-236	JCL
1962	9-275	LC
AEC-tr		
1963	9-193	Henry Brytcher (Trans. No. 3231) Altadena, Calif.
1964	9-194	Henry Brutcher (Trans. No. 3083), Altadena, Calif.
1965	9-156	JCL
1966	9-1258	JCL
1967	9-63	LC
1968	9-64	LC
1969	9-522	JCL
1970	9-80	Associated Technical Services (Trans. 19F4C) East Orange, N. J.
1971	9-195	Henry Brutcher (Trans. No. 3240), Altadena, Calif.
1972	9-1284	LC
1973	9-640	Henry Brutcher (Trans. No. 3405), Altadena, Calif.
1974	9-435	JCL
1975	9-471	LC

Report	Abstract	Availability
AEC-tr		
1976	9-535	Associated Technical Services (Trans. No. 29F4C), East Orange, N. J.
1977	9-536	Associated Technical Services (Trans. No. 31F4C), East Orange, N. J.
1978	9-523	Associated Technical Services (Trans. No. 32F4C), East Orange, N. J.
1979	9-1158	JCL
1980	9-855	JCL
1981	9-882	Associated Technical Services (Trans. 33F4C), East Orange, N. J.
1982	9-891	JCL
1983	9-917	JCL
1984	9-856	LC
1985	9-883	JCL
1986	9-818	JCL
1987	9-902	JCL
1988	9-1214	JCL
1989	9-1215	JCL
1990	9-1184	JCL
1991	9-1216	JCL
1992	9-1063	JCL
1993	9-1765	JCL
1994	9-1793	JCL
1995	9-1865	Henry Brutcher (Trans. No. 3281), Altadena, Calif.
1996	9-1768	LC
1997	9-1706	JCL
1998	9-1866	Henry Brutcher (Trans. No. 3414), Altadena, Calif.
1999	9-1867	Henry Brutcher (Trans. No. 2907), Altadena, Calif.
2000	9-1[illegible]09	LC
2058	9-2003	Associated Technical Services, East Orange, N. J.
2059	9-[illegible]	Associated Technical Services (Trans. No. 76F4F), East Orange, N. J.
2060	[illegible]	LC
2061	[illegible]	JCL
2062	9-179[illegible]	JCL
2063	[illegible]1	JCL
2064	[illegible]1347	JCL
2065	[illegible]	JCL
2066	[illegible]	JCL
2067	[illegible]	Associated Technical Services (Trans. No. 85F4G) East Orange, N. J.
2068	9-[illegible]	JCL
2069	9-[illegible]138	JCL
2070	9-[illegible]	Associated Technical Services (Trans. 83F4G), East Orange, N. J.
2071	9-24[illegible]	JCL
2072	9-24[illegible]7	Associated Technical Services (Trans. 84F4G), East Orange, N. J.
2073	9-25[illegible]4	JCL
2074	9-[illegible]40	JCL
2075	[illegible]	JCL
2076	9-2[illegible]8	JCL
2077	[illegible]	JCL
2078	[illegible]	JCL
2079	9-[illegible]	LC
2080	9-2[illegible]53	JCL
2081	9-2[illegible]6	LC
2082	[illegible]	JCL
2083	9-[illegible]44	JCL
2084	[illegible]	LC
2086	9-[illegible]6	JCL
2087	9-[illegible]17	Associated Technical Services (Trans. 96G4G), East Orange, N. J.
2088	9-3[illegible]5	JCL
2089	[illegible]	JCL
2091	9-3078	Associated Technical Services (Trans. 05G5G), East Orange, N. J.
2093	9-3056	JCL
2094	9-3127	
2095	9-3147	
2096	9-3128	
2097	9-3148	
2098	9-3217	
2099	9-3155	Henry Brutcher (Trans. No. 3474), Altadena, Calif.
2100	9-3711	Henry Brutcher (Trans. No. 3475), Altadena, Calif.
2101	9-3387	JCL
2102	9-3388	JCL
2103	9-3447	JCL
2105	9-3[illegible]25	LC
2106	9-3911	JCL
2107	9-3668	Associated Technical Services (Trans. 19G5G), East Orange, N. J.
2108	9-3731	LC
2109	9-3905	
2110	9-3908	JCL
2111	9-3762	LC
2112	9-4015	JCL
2113	9-3784	LC
2114	9-3780	LC
2115	9-3874	LC
2116	9-3763	Associated Technical Services (Trans. 14G5J), East Orange, N. J.
2117	9-3764	Associated Technical Services (Trans. 16G5J), East Orange, N. J.
2118	9-3765	Associated Technical Service (Trans. 15G5J), East Orange, N. J.
2119	9-3996	Associated Technical Services (Trans. 35G5G), East Orange, N. J.
2120	9-4189	JCL
2122	9-4213	Associated Technical Services (Trans. 49G5G), East Orange. N. J.
2123	9-4248	LC
2124	9-4224	Associated Technical Services (Trans. 48G5G), East Orange, N. J.
2127	9-[illegible]287	LC
2128	9-4190	JCL
AECD		
3639	9-987	Dep.(mc)
3640	9-169	Dep.(mc)
3641	9-2837	Dep.
3642	9-2404	Dep.; $0.25
AECU		
2779	9-966	Dep.
2938	9-50	J. Phys. Chem. 58, 805-11(1954); Dep.(mc)
2942	9-292	Dep.(mc)
2944	9-293	Dep.(mc)
2945	9-9	Dep.
2948	9-138	Dep.(mc)
2949	9-1893	Dep.(mc)
2950	9-936	Dep.(mc)
2951	9-1[illegible]	Dep.(mc)
2952	9-11	Dep.
2953	9-532	Dep.(mc)
2954	9-152	Dep.(mc)
2955	9-143	Dep.(mc)
2956	9-2470	Phys. Rev. 98, 28-39(1955); Dep.; $0.45
2957	9-474	Dep.(mc)
2958	9-734	Dep.(mc)
2959	9-512	Dep.(mc)

Report	Abstract	Availability
AECU		
2961	9-546	Dep.(mc)
2962	9-547	Dep.(mc)
2963	9-1133	Dep.(mc)
2964	9-648	Dep.(mc)
2965	9-513	Dep.(mc)
2966	9-649	Dep.(mc)
2967	9-2589	Dep.
2968	9-514	Dep.(mc)
2969	9-1017	Dep.(mc)
2970	9-848	Dep.(mc)
2971	9-849	Dep.(mc)
2972	9-934	Dep.(mc)
2973	9-1066	Dep.(mc)
2974	9-850	Dep.(mc)
2975	9-2026	Dep.(mc)
2976	9-967	Dep.(mc); Ind. Dep.
2977	9-2546	Dep.
2978	9-1181	Dep.(mc)
2980	9-1580	Dep.(mc)
2981	9-1550	Dep.
2982	9-1597	Dep.(mc)
2983	9-1962	Dep.(mc)
2984	9-1963	Dep.(mc)
2985	9-2106	Dep.(mc)
2986	9-2107	Dep.(mc)
2987	9-2108	Dep.(mc)
2989	9-2207	Dep.
2990	9-2330	Dep.(mc)
2991	9-2331	Dep.(mc)
2992	9-2251	Dep.(mc)
2993	9-2723	Dep.(mc)
2995	9-3660	Dep.
2996	9-1863	Dep.(mc)
2997	9-3442	Dep.(mc)
2998	9-2989	Dep.(mc)
2999	9-2990	Dep.(mc)
3000	9-3143	Dep.
3001	9-3210	Dep.(mc)
3002	9-3144	Dep.(mc)
3004	9-2948	Dep.(mc)
3005	9-3211	Dep.(mc)
3006	9-3251	Dep.(mc)
3007	9-3381	Dep.(mc)
3008	9-3574	Dep.(mc)
3009	9-3575	Dep.(mc)
3010	9-3576	Dep.(mc)
3011	9-3816	Dep.(mc)
3013	9-3458	Dep.(mc); Ind. Dep.
3014	9-3751	Dep.(mc)
3015	9-3995	Dep.(mc)
3016	9-3722	Dep.(mc)
3017	9-3723	Dep.(mc)
3018	9-3724	Dep.(mc)
3019	9-3725	Dep.(mc)
3020	9-3823	Dep.(mc)
3021	9-4205	Dep.(mc)
3024	9-4145	Dep.(mc)
ANL		
4863	9-930	Dep.
5135	9-127	Dep.
5227	9-618	Dep.
5256	9-340	Dep.(mc)
5276	9-1804	Dep.
5304	9-608	Dep.
5306	9-817	Dep.
5312	9-925	Dep.
ANL		
5316	9-494	Dep.
5317	9-988	Dep.
5319	9-2691	Dep.
5332	9-3	Dep.
5359	9-3501	Dep.
5365	9-1231	Dep.
5368	9-4237	Dep.
5378	9-2538	Dep.
5378(p.65-186)	9-2547	
5378(p.2-64)	9-2539	
5381	9-2949	Dep.
5386	9-2500	Dep.
5405	9-37[illegible]	Dep.
5410	9-43[illegible]	Dep.
APEX		
176	9-2983	Dep.
179	9-2700	Dep.
BM-RI		
5126	9-4167	Dep.(mc)
BMI		
706	9-1503	Dep.; $0.35
970	9-1854	Dep.; $0.20
982	9-3113	Dep.(mc); Ind. Dep.
BNL		
278	9-695	Dep.; $0.55
280	9-3975	Dep.
303	9-4038	Dep.
305	9-3004	Dep.
308	9-726	Dep.; $0.25
314	9-2099	Dep.
317	9-1781	Dep.; $0.20
322	9-3285	Dep.
323	9-3120	Dep.
326	9-4039	Dep.
1694	9-28	Genetics 39, 587-603(1954)
1696	9-35[illegible]	J. Polymer Sci. 14, 427-42(1954)
1781	9-1284	Nucleonics 12, No. 12, 14-18(1954); Dep.(mc)
1794	9-1416	Dep.(mc)
1816	9-1417	Dep.(mc)
1831	9-12[illegible]	Anal. Chem. 27, 166-7(1955); Dep.(mc)
1835	9-472	Arch. Internal Med. 94, 52[illegible]-[illegible]1(1954)
1854	9-2144	J. Chem. Phys. 23, 152-4(1955)
1855	9-922	Testile Research J. 24, 785-91(1954)
1857	9-40[illegible]9	Combined with BNL-1885 and BNL-1886 in J. Chem. Phys. 23, 673-80(1955)
1858	9-873	J. Am. Chem. Soc. 76, 6006-8(1954)
1874	9-1315	Dep.(mc)
1879	9-1782	J. Chem. Phys. 22, 2026-8(1954)
1880	9-3369	Ann. N. Y. Acad. Sci. 59, 514-35(1955)
1885	9-409[illegible]	Combined with BNL-1857 and BNL-1886 in J. Chem. Phys. 23, 673-80(1955)
1886	9-40[illegible]	Combined with BNL-1857 and BNL-1885 in J. Chem. Phys. 23, 673-80(1955)
1888	9-530	J. Am. Chem. Soc. 76, 4054(1954)
1890	9-473	J. Biol. Chem. 211, 279-87(1954)
1891	9-561	Nucleonics 12, No. 11, 55(1954)
1903	9-565	Nucleonics 12, No. 11, 61(1954)
1906	9-906	J. Chem. Phys. 22, 1924-5(1954)
1912	9-311	Rev. Sci. Instr. 25, 1025(1954)
1915	9-763	Phys. Rev. 96, 709-12(1954)
1925	9-587	Nucleonics 12, No. 11, 75(1954)
1931	9-610	Nucleonics 12, No. 11, 78-9(1954)
1940	9-1729	Biol. Bull. 107, 329-34(1954)

Report	Abstract	Availability
BNL		
1944	9-1132	Phys. Rev. 96, 1014-17(1954)
1945	9-3006	Proc. Natl. Acad. Sci. U. S. 41, 155-60 (1955)
1950	9-2840	J. Chem. Phys. 23, 477-82(1955); Dep.(mc)
1961	9-2648	J. Phys. Chem. 59, 189-91(1955)
1962	9-124	Arch. Biochem. and Biophys. 52, 484-5 (1954)
1964	9-2656	Nucleonics 13, No. 2, 48(1955)
1967	9-3061	J. Am. Chem. Soc. 77, 1388-90(1955)
1977	9-991	Phys. Rev. 96, 951-68(1954)
1995	9-1588	Rev. Sci. Instr. 25, 1219(1954)
1998	9-1679	Phys. Rev. 96, 1610-13(1954)
2002	9-3279	Phys. Rev. 97, 1023-4(1955)
2004	9-483	Science 120, 809-10(1954)
2010	9-1054	Rev. Sci. Instr. 25, 1129(1954)
2013	9-2921	Phys. Rev. 97, 766-9(1955)
2039	9-1986	Phys. Rev. 97, 181-3(1955)
2045	9-1154	Dep.(mc)
2047	9-2940	Phys. Rev. 97, 797-808(1955)
2052	9-475	Science 121, 641-2(1955); Dep.(mc)
2055	9-3645	Phys. Rev. 97, 1199-1204(1955)
2056	9-4303	Phys. Rev. 98, 100(1955)
2060	9-1355	Phys. Rev. 96, 1450-2(1954)
2062	9-3718	Am. J. Botany 42, 384-94(1955)
2063	9-476	Dep.(mc)
2064	9-1682	Phys. Rev. 96, 1712-13(1954)
2066	9-2922	Phys. Rev. 97, 780-2(1955)
2071	9-1155	Arch. Biochem. Biophys. 54, 556-7(1955); Dep.(mc)
2072	9-3337	Phys. Rev. 97, 991-1002(1955).
2075	9-1366	Rev. Sci. Instr. 26, 232-3(1955); Dep.(mc)
2085	9-2006	Phys. Rev. 97, 243(1955)
2089	9-3651	Phys. Rev. 97, 1303-4(1955)
2096	9-2692	Dep.(mc)
[illegible]	9-4090	J. Chem. Phys. 23, 759-60(1955)
2113	9-2787	Dep.(mc)
2114	9-2200	J. Am. Chem. Soc. 77, 507(1955)
2128	9-3680	Phys. Rev. 97, 1314-24(1955)
2140	9-2413	Rev. Sci. Instr. 26, 402-3(1955); Dep.(mc)
2143	9-3318	Phys. Rev. 97, 1186-8(1955)
2153	9-4257	Phys. Rev. 98, 121-30(1955)
2154	9-3238	Phys. Rev. 97, 1179-80(1955)
2176	9-4102	J. Chem. Phys. 23, 764-5(1955)
2177	9-4270	Phys. Rev. 98, 212-14(1955)
2204	9-4262	Phys. Rev. 98, 218-19(1955)
2208	9-4259	Phys. Rev. 98, 205-6(1955)
2242	9-4216	Dep.(mc)
2255	9-4044	Dep.(mc)
2275	9-4100	Dep.(mc)
2284	9-4042	Dep.(mc)
2294	9-4207	Dep.(mc)
BNL-L		
62(p.159-62)	9-1376	LC
CF (ORNL)		
53-12-111	9-2984	See ORNL-1840
54-9-54	9-3803	Nucleonics 13, Vol. 4, 66-9(1955) (Condensed)

Report	Abstract	Availability
COO		
148	9-3890	Dep.(mc)
161	9-685	Chem. Eng. Progr. 50, 560-4(1954)
163	9-2211	Anal. Chem. 27, 83-7(1955)
186	9-539	Anal. Chem. 26, 1572-5(1954)
206	9-1530	Dep.(mc); Ind. Dep.
CU (Misc.)		
15-54-AEC-1019-Chem.	9-1590	See NYO-6139
20-54-AEC-204-MET	9-1861	See NYO-3968
134	9-3965	Dep.(mc)
DP		
62	9-1598	Dep.
79	9-298	Dep.
81	9-153	Dep.(mc)
88	9-1196	Dep.
93	9-1596	Dep.
94	9-2725	Dep.
95	9-1942	Dep.
99	9-2194	Dep.
110	9-3925	Dep.
111	9-3926	Dep.
112	9-4229	Dep.
F-TS		
7083-RE	9-3911	see AEC-tr-2106
FMPC		
471	9-1283	Dep.
GEL		
90	9-609	Dep.
HW		
10792	9-290	Dep.; $0.10
29071(Rev.)	9-629	Dep.; $0.10
30185	9-3212	Dep.(mc)
30220	9-501	Dep.(mc)
30231	8-6077	Radiation Research 2, 166-70(1955)
30340	9-12	Dep.(mc)
30781	9-540	Nucleonics 12, No. 11, 54(1954) (Condensed); Dep.; $0.25
31935	9-368	Dep.; $0.20
31961	9-2950	Dep.
32121	9-400	Dep.(mc); Ind. Dep.
32166	9-696	Dep.; $0.25
32626	9-585	Dep.
32676	9-128	Dep.
33122	9-3927	Dep.
33744	9-1703	Dep.(mc)
33881	9-3835	Dep.
34032	8-942	Dep.(mc)
35174	9-3752	Dep.(mc)
IDO		
14320	9-533	Dep.(mc)
16073	9-2446	Dep.; $0.35
16194	9-271	Dep.(mc)
16205	9-2056	Dep.(mc)

Report	Abstract	Availability
ISC		
255(Rev.)	9-2155	J. Am. Chem. Soc. 77, 324-5(1955)
380	9-2788	Dep.
405	9-1759	Dep.(mc)
437(Rev.)	9-586	Dep.; $0.20
454	9-1599	Dep.(mc)
464	9-1302	Dep.(mc)
465	9-595	J. Phys. Chem. 58, 908-11(1954)
469	9-1121	Dep.
489	9-2082	Spectrochim. Acta 6, 341-72(1954)
497	9-1036	Dep.
498	9-2821	Phys. Rev. 95, 413-17(1954); Dep.
499	9-1037	Dep.(mc); Ind. Dep.
509	9-4081	Anal. Chem. 27, 572(1955)
510	9-2951	Dep.
511	9-1680	Phys. Rev. 96, 1620(1954)
512	9-1790	Dep.(mc)
515	9-802	Dep.
517	9-2133	Dep.
518	9-989	Dep.
520	9-875	Dep.
521	9-851	Dep.
522	9-2506	Phys. Rev. 97, 432-3(1955)
533	9-1994	Dep.(mc)
537	9-3339	Phys. Rev. 97, 1031-3(1955)
543	9-1219	Dep.(mc)
547	9-931	Dep.
548	9-1212	Dep.(mc); Ind. Dep.
550	9-1247	Dep.; $0.20
551	9-1213	Dep.; $0.25
552	9-3444	Dep.(mc)
553	9-1481	Dep.(mc); Ind. Dep.
554	9-1760	Dep.(mc)
558	9-2022	Dep.(mc)
560	9-2382	Dep.(mc); Ind. Dep.
561	9-2023	Dep.(mc)
564	9-2726	Dep.(mc)
565	9-3052	Dep.(mc)
569	9-3246	J. Am. Chem. Soc. 77, 1393(1955)
572	9-3170	Dep.
577	9-4266	Dep.(mc)
578	9-3242	Dep.(mc); Ind. Dep.
581	9-3053	Dep.(mc)
K		
1148	9-898	Dep.
1186	9-2789	Dep.
1187	9-3445	Dep.
1190	9-2838	Dep.
1191	9-3213	Dep.
1204	9-3410	Dep.
KAPL		
950	9-369	Dep.
973	9-4117	Dep.
1138	9-3286	Dep.
1161	9-3124	Dep.
1178	9-36	Dep.
1180	9-420	Dep.
1198	9-154	Dep.
1201	9-303	Nucleonics 13, No. 5, 54-6(1955); Dep.
1205	9-1[illegible]	Dep.
1213	9-2[illegible]	Dep.
1227	9-969	Dep.
1231	9-1038	Dep.
1232	9-819	Dep.
1236	9-1308	Dep.
1237	9-1317	Dep.
1241	9-1655	Dep.
1242	9-1118	Dep.
1243	9-1582	Dep.
1248	9-1822	Dep.
1262	9-2517	Dep.
1265	9-2689	Dep.
1269	9-2927	Dep.
1275	9-2162	Dep.
1276	9-2827	Dep.
1277	9-2655	Dep.
1280	9-3287	Dep.
1300	9-4075	Dep.
1307	9-4010	Dep.
1309	9-4169	Dep.
KLX		
1395	9-3122	Dep.
LA		
1651	9-619	Dep.
1654	9-376	Dep.
1667	9-1823	Dep.
1668	9-620	Dep.
1686	9-155	Dep.
1694	9-301	Dep.
1706	9-1761	Dep.
1713	9-302	Dep.
1721	9-876	Dep.
1725	9-692	Dep.
1727	9-1896	Dep.
1730	8-1824	Dep.
1734	9-1697	Dep.
1736	9-2016	Phys. Rev. 98, 41-2(1955); Dep.
1740	9-1551	Dep.
1835	9-3928	Dep.
1837	9-1600	Nucleonics 13, No. 5, 62(1955); Dep.
1845	9-1762	Dep.
1848	9-1711	Dep.
1849	9-3007	Dep.
1851	9-1739	Dep.
1855	9-1740	Dep.
1856	9-1943	Dep.
1864	9-4110	Dep.
1867	9-3811	Dep.
1878	9-3913	Dep.
LRL		
138	9-370	Dep.; $0.35
145	9-799	Dep.; $0.25
157	9-144	Dep.(mc); Ind. Dep.
MITS		
26	9-3111	See NYO-6263
ML		
240	9-772	Dep.; $0.25
252	9-3660	See AECU-2995

Report	Abstract	Availability
MLM		
656	9-1479	Dep.; $0.25
735	9-76	Dep.(mc)
788(Rev.)	9-1490	Dep.
818	9-1236	Dep.
871	9-3929	Dep.
891	9-1475	Dep.; $0.25
901	9-54	Dep.
909	9-3757	Dep.
921	9-1235	Dep.
934	9-2181	Dep.
938	9-2399	Anal. Chem. 27, 567-9(1955); Dep.
943	9-2952	Dep.
956	9-2844	Dep.
973	9-4060	Dep.
967	9-2671	Dep.
970	9-2054	Dep.; $0.20
997	9-2332	Dep.
1002	9-3793	Dep.
MTA		
45	9-774	Dep.(mc)
NAA-AER		
1018	9-1953	Nucleonics 13, No. 1, 64(1955) (Condensed)
NAA-SR		
278	9-2	Dep.; $0.45
863	9-3097	Dep.(mc)
985	9-139	Dep.; $0.45
1014	9-631	Dep.
1050	9-852	Dep.
1061	9-1478	Dep.
1103	9-2163	Dep.
1159	9-3861	Dep.; Ind. Dep.
1239	9-3862	Dep.
NAA-SR-Memo		
707	9-4285	Dep.(mc)
1107	9-3914	Dep.; Ind. Dep.
NBL		
104	9-3070	Dep.
NBS		
3339	9-273	Dep.(mc)
3756	9-1418	Dep.
3845	9-3117	Dep.
3992	9-3892	Dep.(mc)
4005	9-3893	Dep.(mc)
NDA		
15C-12	9-2031	Dep.(mc)
15C-39	9-1106	Dep.
15C-40	9-1107	Dep.
NDA-Memo		
15C-63	9-2518	Dep.(mc)
NEVIS		
4	9-775	Phys. Rev. 97, 492-504(1955); Dep.(mc)
7	9-4253	Dep.(mc)
8	9-4254	Dep.(mc)

Report	Abstract	Availability
NNES		
I-9	9-656	See TID-5211
I-11	9-145	See TID-5210
NYO		
474	9-820	Dep.
1589	9-932	Dep.(mc)
3075	9-2472	Dep.; $1.25
3131	9-800	Dep.
3365	9-621	Dep.(mc)
3366	9-622	Dep.(mc)
3490	9-1285	J. Appl. Phys. 25, 1538-42(1954)
3497	9-2734	Dep.
3498	9-1860	Dep.
3525	9-58	Dep.(mc)
3605	9-3396	Anal. Chem 27, 459-61(1955)
3607	9-3395	Anal. Chem. 27, 340-6(1955)
3609	9-1205	Anal. Chem. Acta 11, 574-85(1954)
3626	9-953	Part A, p14-17; Part B, p10-13; Part C, p18-20 of: Proceedings of the Conference on Nuclear Processes in Geologic Settings, Williams Bay, Wisconsin, Sept. 21-23, 1953. (Printed by Univ. of Chicago Press, 1954)
3627	9-2265	Ann. Rev. Nuclear Sci. 4, 401-62(1954)
3637	9-1752	J. Phys. Chem. 59, 80-4(1955)
3780	9-2051	Dep.(mc)
3781	9-1040	Dep.(mc)
3782	9-3932	Dep.(mc)
3791	9-2098	Dep.(mc)
3823	9-394	Dep.(mc)
3845	9-1091	Phys. Rev. 96, 1100-3(1954)
3863	9-2854	Dep.(mc)
3896	9-3772	J. Am. Chem. Soc. 77, 1473-6(1955)
3917	9-636	Dep.(mc)
3934-II	9-4234	Dep.(mc)
3956(Suppl.)	9-2333	Dep.(mc)
3968	9-1861	Dep.
3974	9-2520	Dep.(mc)
4005	9-5	Dep.(mc)
4603	9-531	Dep.(mc)
4604	9-534	Dep.
4616	9-2855	Dep.
4916	9-3376	Dep.
4917	9-3047	Dep.
4964	9-17	Cancer Research 15, 100-4(1955); Dep.
4968	9-18	Dep.(mc)
4986	9-1736	J. Gen. Physiol. 38, 389-404(1955)
4987	9-1735	J. Gen. Physiol. 38, 371-88(1955)
4989	9-4066	J. Histochem. Cytochem. 3, 103-21(1955)
4990	9-1704	Dep.; $0.80
6059	9-1511	Dep.(mc)
6060	9-3461	Dep.
6061	9-3462	Dep.
6062	9-1826	Dep.(mc)
6063	9-1827	Dep.(mc)
6072	9-401	Dep.(mc)
6102	9-262	Dep.(mc)
6103	9-91	Dep.(mc)
6114	9-1862	Dep.(mc); Ind. Dep.
6139	9-1590	Dep.(mc)
6168 [Pt. 1.]	9-646	J. Electrochem. Soc. 101, 124-7(1954)
6256	9-166	Mining Eng. 6, 925-8(1954)
6257	9-1486	Mining Eng. 6, 1196-1202(1954); Dep.(mc)

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NYO		
6259	9-1476	Anal. Chem. 27, 467-8(1955); Dep.(mc)
6261	9-3107	Mining Eng. 7, 66-72(1955)
6262	9-623	Dep.(mc)
6263	9-3111	Dep.(mc); Ind. Dep.
6277	9-864	J. Am. Chem. Soc. 76, 5833-9(1954)
6278	9-865	J. Am. Chem. Soc. 76, 5839-42(1954)
6296	9-653	Dep.
6297	9-2702	Dep.
6323	9-637	Dep.
6324	9-2735	Dep.
6386	9-3096	J. Am. Chem. Soc. 76, 6210(1954)
6391	9-3113	Can. J. Chem. 33, 245-50(1955)
6402	9-1187; 9-1229	J. Am. Chem. Soc. 76, 4755-63(1954); J. Am. Chem. Soc. 76, 4763-5(1954)
6403	9-109	J. Am. Chem. Soc. 76, 5216-20(1954)
6446	9-946	Dep.
6447	9-2793	Dep.
6511	9-2496	Dep.
6538	9-776	Phys. Rev. 97, 783-91(1955); Dep.(mc)
6541	9-1653	Dep.(mc)
6542	9-1140	Dep.(mc)
6543	9-1946	Dep.(mc)
6561	9-1565	Dep.(mc)
6567	9-777	Dep.(mc)
6568	9-1108	Dep.(mc)
6570	9-1909	Phys. Rev. 97, 240-2(1955)
6571	9-1111	Phys. Rev. 96, 1104-15(1954)
6572	9-1660	Phys. Rev. 96, 1654-8(1954)
6574	9-790	Phys. Rev. 96, 812(1954)
6582	9-245	Phys. Rev. 96, 532-3(1954)
6584	9-1114	Phys. Rev. 96, 1156-7(1954)
6585	9-869	J. Am. Chem. Soc. 76, 5887-8(1954)
6589	9-3390	J. Phys. Chem. 59, 235-7(1955)
6595	9-971	Dep.
6596	9-3675	J. Appl. Phys. 26, 128-9(1955)
6597	9-3886	J. Appl. Phys. 26, 491-2(1955)
6605	9-2151	J. Am. Chem. Soc. 77, 258-60(1955)
6608	9-4070	J. Am. Chem. Soc. 77, 265-6(1955)
6609	9-4071	J. Am. Chem. Soc. 77, 1994-5(1955)
6611	9-4072	J. Am. Chem. Soc. 77, 2011-12(1955)
6616	9-1467	Dep.
6617	9-2135	Dep.
6625	9-1681	Phys. Rev. 96, 1711-12(1954)
6660	9-1356	Phys. Rev. 96, 1452-3(1954)
6668	9-2924	Dep.(mc)
7006	9-3177	Dep.
7042	9-972	Dep.
7043	9-2294	Dep.
7072	9-973	Dep.
7073	9-2295	Dep.
7100	9-654	Dep.(mc)
ORNL		
991	9-2907	Dep.
1027	9-1641	Dep.; $0.25
1572	9-371	Dep.; $0.45
1641	9-2633	Dep.
1682	9-750	Dep.; $0.20
1744	9-3411	Anal. Chem. 27, 453-4(1955)
1747	9-129	Dep.; $0.35
1769	9-1492	Dep.; $0.35

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ORNL		
1779	9-655	Dep.; $0.35
1798	9-1067	Dep.
1802	9-2794	Dep.
1807	9-2831	Dep.
1811	9-901	Dep.
1828	9-2385	Dep.
1830	9-2991	Dep.
1833	9-1825	Dep.
1840	9-2984	Dep.
1842	9-2845	Dep.(mc)
1848	9-3384	Dep.
1862	9-3330	Dep.
1876	9-4240	Dep.
ORO		
121	9-1807	Dep.
131	9-185	Dep.
132	9-1445	Dep.; $0.45
133	9-1156	Dep.
134	9-1555	Dep.; $0.25
135	9-2208	Dep.(mc)
137	9-4101	Dep.
P		
395-AEC	9-3442	See AECU-2997
540-AEC	9-1863	See AECU-2996
585-AEC	9-2989	See AECU-2998
591-AEC	9-2990	See AECU-2999
[illegible]		
53GL186	9-3288	Dep.
54GL269	9-609	See GEL-90
RL		
1148	9-189	See SO-2516
1175	9-187	See SO-2035
1190	9-188	See SO-2036
1191	9-190	See SO-2517
1237	9-1864	See SO-2037
1251	9-3179	See SO-2518
1259	9-3866	See SO-2038
1261	9-3180	See SO-2519
1291	9-3867	See SO-2039
RM		
1420-AEC	9-2990	See AECU-2999
RME		
22(Pt. 1)	9-160	Dep.; $0.25
[illegible]	9-1512	Dep.; $0.35
69(Pt. 1)	9-1513	Dep.; $0.20
70	9-1256	Dep.; $0.25
71	9-1828	Dep.; $0.20
2009	9-161	Dep.; $0.20
2010	9-1257	Dep.; $0.20
2011	9-2708	Dep.
2012	9-3154	Dep.
3092	9-1829	Dep.
3102	9-2262	Dep.; $0.45
3103	9-1514	Dep.
4058	9-624	Eng. Mining J. 156, 119-22(1955); Dep.(mc)

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RMO		
2731	9-1183	Dep.(mc)
2732	9-1746	Dep.(mc)
3044	9-1792	Dep.(mc)
SO		
2035	9-187	Dep.(mc)
2036	9-188	Dep.(mc); Ind. Dep.
2037	9-1864	Dep.(mc)
2038	9-3866	Dep.(mc)
2039	9-3867	Dep.(mc)
2516	9-189	J. Metals 7, 395-400(1955); Dep.(mc); Ind. Dep.
2517	9-190	Dep.(mc); Ind. Dep.
2518	9-3179	Dep.(mc); Ind. Dep.
2519	9-3180	Dep.(mc); Ind. Dep.
TEI		
292	9-628	U. S. Geol. Survey Circ. 348, Free (USGS)
401	9-2514	Nuovo cimento 12, Suppl. No. 3, 549-71 (1954)
403	9-702	U. S. Geol. Survey Circ. 353, (USGS)
405	9-3829	Am. Mineralogist 40, 201-6(1955)
412	9-3398	Anal. Chem. 27, 475-6(1955)
413	9-1522	U. S. Geol. Survey Bull. 1021-A, 1955; $0.15 (GPO)
415	9-162	Dep.; $0.80
417	9-3471	Am. J. Sci. 253, 121-4(1955)
418	9-3464	Geochim. et Cosmochim. Acta 7, 61-76 (1955)
436	9-956	U. S. Geol. Survey Circ. 358. Free (USGS)
437	9-3466	U. S. Geol. Survey Circ. 349, 1955
450	9-880	Dep.; $0.25
453	9-78	Dep.; $0.25
461	9-881	Dep.; $0.10
TEM		
341A	9-2263	Dep.; $0.45
443A	9-2709	Dep.
644	9-3828	U. S. Geol. Survey
740	9-165	U. S. Geol. Survey Circ. 351; Free (USGS)
784	9-1515	Dep.; $0.25
82(Suppl. 2)	9-929	JCL
3032(Suppl. 1)	9-2077	Dep.; $0.20
3036(Rev.)	9-288	Dep.; $0.80
3058	9-233	Dep.; $0.25
5001(1st Rev.)	9-2100	Dep.; $2.10
5156	9-4146	Dep.(mc)
5210	9-145	Dep.; $1.75
5211	9-656	Dep.; $1.85
5252	9-2535	Dep.
U		
23920	9-3723	See AECU-3017
UCLA		
304	9-700	Dep.; $0.25
305	9-1966	Dep.(mc)
309	9-1042	Nucleonics 13, No. 3, 58-60(1955); Dep.; $0.20
311	9-37	Dep.(mc)

Report	Abstract	Availability
UCLA		
312	9-3033	Dep.(mc)
313	9-106	Dep.(mc)
314	9-6	Dep.(mc)
315	9-701	Dep.(mc)
316	9-1488	Dep.; $1.05
317	9-846	Dep.(mc)
318	9-2164	Dep.; $0.25
319	9-1462	Dep.(mc)
321	9-1764	Dep.(mc)
322	9-2334	Dep.(mc)
323	9-3747	Proc. Soc. Exptl. Biol. Med. 88, 475-7 (1955)
324	9-2550	Dep.(mc)
327	9-3005	Dep.(mc)
328	9-3753	Dep.(mc)
331	9-4056	Dep.(mc)
UCRL		
1427	9-778	Dep.; $0.25
1651 (2nd Rev.)	9-771	Dep.(mc)
1880	9-2416	Dep.; $0.55
2301	9-402	Dep.; $2.55
2351	9-34	J. Aviation Med. 25, 326-30(1954)
2393(2nd Rev.)	9-1659	Phys. Rev. 96, 1621-7(1954)
2479	9-304	Dep.(mc)
2579(Rev.)	9-4245	Dep.(mc)
2580	9-1388	Phys. Rev. 96, 1267-8(1954)
2597	9-803	Phys. Rev. 96, 730-4(1954)
2613	9-4020	Ann. Rev. Nuclear Sci. 4, 157-90(1954)
2621	9-767	Phys. Rev. 96, 714-15(1954)
2623	9-449	Dep.; $0.25
2631	9-2197	Dep.
2632	9-123	Dep.; $0.25
2633	9-305	Dep.; $0.10
2637	9-1671	Phys. Rev. 96, 1549-53(1954)
2652	9-1688	Dep.(mc)
2654	9-2060	Phys. Rev. 97, 117-20(1955)
2662	9-377	Dep.; $0.60
2666	9-107	Chem. Eng. 62, No. 4, 226-30(1955); Dep.; $0.25
2667	9-4328	Superseded by Phys. Rev. 98, 79-84(1955)
2669	9-1633	Phys. Rev. 96, 1568-72(1954)
2671	9-360	Phys. Rev. 96, 541(1954)
2680	9-657	Dep.; $0.25
2681	9-117	Dep.(mc)
2682	9-48	Dep.(mc)
2683	9-59	Dep.; $0.10
2684	9-789	Phys. Rev. 96, 807-9(1954)
2685	9-1993	Phys. Rev. 97, 184-7(1955)
2694	9-60	Dep.(mc)
2695	9-2998	Phys. Rev. 97, 823-30(1955)
2696	9-1480	Dep.(mc); Ind. Dep.
2698	9-3662	Dep.
2699	9-378	Dep.(mc)
2700	9-3652	Phys. Rev. 97, 1305-13(1955)
2704	9-102	Dep.(mc)
2708	9-395	Dep.(mc)
2709	9-61	Dep.(mc)
2710	9-3316	Phys. Rev. 97, 1077-83(1955)
2744	9-735	Dep.(mc)
2745	9-506	Dep.(mc)

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UCRL		
2746	9-1689	Dep.(mc)
2748	9-306	Nucleonics 13, No. 3, 44-6(1955); Dep.(mc)
2749	9-3314	Phys. Rev. 97, 1059-70(1955)
2753	9-760	Dep.(mc)
2754	9-736	Dep.(mc)
2768	9-3684	Phys. Rev. 97, 1255-8(1955)
2771	9-1644	Dep.(mc)
2774	9-1456	Dep.(mc)
2779	9-3940	Proc. Soc. Exptl. Biol. Med. 88, 383-6 (1955)
2781	9-2452	Phys. Rev. 97, 564-5(1955)
2783	9-2411	Dep.; $0.25
2790	9-1446	Dep.(mc)
2792	9-1477	Dep.(mc)
2793	9-1709	Proc. Soc. Exptl. Biol. Med. 87, 626-9 (1954)
2794	9-2198	Dep.(mc)
2795	9-2465	Rev. Sci. Instr. 26, 220-8(1955); Dep.(mc)
2798	9-4320	Phys. Rev. 98, 22-3(1955)
2799	9-2914	Dep.
2803	9-2823	J. Phys. Chem. 59, 105-9(1955)
2805	9-2890	Dep.(mc)
2806	9-1645	Dep.(mc)
2812	9-1712	Dep.(mc)
2813	9-1669	Dep.(mc)
2818	9-3663	Dep.
2822	9-3664	Dep.
2823	9-2551	Dep.
2827	9-3377	Dep.
2828	9-2608	Dep.
2832	9-2437	Dep.(mc)
2833	9-2929	Dep.
2836	9-2540	Proc. Soc. Exptl. Biol. Med. 88, 73-5 (1955); Dep.(mc)
2837	9-2195	Dep.
2841	9-2136	Dep.
2843	9-2930	Dep.
2845	9-3364	Dep.
2846	9-3357	Dep.
2853	9-3048	Dep.
2854	9-2137	Dep.
2857	9-3009	Dep.
2858	9-3954	Dep.
2859	9-3089	Dep.(mc); Ind. Dep.
2860	9-2609	Dep.
2862	9-3071	Dep.
2865	9-3253	Dep.
2881	9-3730	Dep.
2920	9-3966	Dep.
2929	9-3778	Dep.
2930	9-4212	Dep.(mc)
4319	9-1320	Nucleonics 12, No. 3, 26-7(1954)
4371	9-4286	Dep.(mc)
4377	9-2634	Dep.
4379	9-4300	Dep.(mc)
4386(Rev.)	9-2021	Phys. Rev. 97, 242(1955)
4400	9-4280	Phys. Rev. 98, 42(1955)
4426	9-2218	Dep.
4432	9-3055	Dep.
4433	9-4025	Dep.
4436	9-2474	Dep.
4459	9-3446	Dep.
4465	9-4246	Dep.(mc)
4474	9-3936	Dep.
UCSF		
10	9-1723	Dep.
UR		
280	9-1731	Arch. Ind. Health 11, 11-16(1955)
307	9-1728	Dep.
308	9-4048	Dep.
310	9-4049	Dep.
327	9-19	Dep.
354	9-481	Dep.
355	9-1157	Dep.
363	9-62	Dep.
365	9-847	Dep.
367	9-916	Dep.
376	9-1705	Dep.
379	9-3010	Dep.
380	9-2521	Dep.
384	9-4050	Dep.
385	9-4045	Dep.
390	9-4076	Dep.
392	9-4055	Dep.
WAPD-ReS		
13	9-429	Dep.(mc)
WAPD-RM		
159	9-2742	Dep.
213	9-779	Dep.; $0.55
WAPD-T		
170	9-1656	Dep.(mc)
WASH		
182	9-659	Dep.; $0.70
183	9-79	Dep.; $0.20
512	9-3098	Dep.
WIN		
7	9-2635	Dep.(mc)
10	9-3779	Dep.(mc)
XDC		
54-4-12	9-2700	See APEX-179
Y		
577	9-1955	Dep.; $0.25
623	9-1956	Dep.; $0.25
628	9-1591	Dep.; $0.25
669	9-1592	Dep.; $0.25
671	9-1957	Dep.; $0.20
692	9-1593	Dep.; $0.25
693	9-1312	Dep.; $0.25
779	9-2406	Dep.; $0.25
813	9-2839	Dep.
958(1953 Suppl.)	9-1961	Dep.

PART II

Report	Abstract	Availability
ACSIL/Liby (British)		
9	9-2237	
AD		
167	9-1529	See ATI-161851
221	9-964	See AD-29006
222	9-965	See AD-29007
223	9-3856	See AD-43830
1292	9-3809	
3245	9-1820	See WADC-TR-52-67
4479	9-3775	
5397	9-3840	
5787	9-3081	
6374	9-2847	
6512	9-2848	
6685	9-3841	
6916	9-4126	
7151	9-4241	
7152	9-4242	
7369	9-2632	See MR-538
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1536	9-3912	$1.25
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5419	9-480	
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5518	9-2286	
5519	9-2287	
5520	9-2288	
5521	9-2289	
5522	9-2290	
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ABSTRACTS OF CLASSIFIED REPORTS

Volume 9 June 30, 1955 No. 12B

NEW NUCLEAR DATA

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Compiled by the Nuclear Data Group National Research Council

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INTRODUCTION

This issue of Nuclear Science Abstracts contains the semi-annual cumulated list of new nuclear data. Issue 18B will contain the next quarterly list and issue 24B the annual cumulation of all data in the 1955 lists. The 1952, 1953, and 1954 annual cumulations are contained in Vol. 6, No. 24B; Vol. 7, No. 24B; and Vol. 8, No. 24B, respectively, and are available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., for $0.25 each. Send check or money order but not stamps.

Nuclear Data Cards: As the current literature is surveyed, the new nuclear results are first printed on 3- by 5-in. cards which are collected into sets of 100 to 150 cards each month. Individuals, laboratories, or libraries may subscribe to the card sets directly by applying to the Publications Office, National Research Council, 2101 Constitution Avenue, N.W., Washington 25, D. C. The price, based on actual mechanical costs, is currently $20 per year domestic and $30 per year foreign (air mail postage included for foreign but not for domestic subscriptions).

The Nuclear Data Group, which is sponsored by the National Research Council, is supported by the U. S. Atomic Energy Commission and the National Bureau of Standards.

CONVENTIONS

All energies are given in Mev and all cross sections in barns unless otherwise stated in the tabular material.

Numerals in italics, following measured values, are the errors (as reported by the authors) in the last figures of the values. In cases where confusion seems possible, the conventional ± is used.

Magnetic moments are reported as before without diamagnetic correction. They are based on $\mu(H) = 2.79267$ and the substandards listed by H. Walchli, ORNL-1469.

In writing reactions, the upper right hand superscript denoting A, the mass number of the target nucleus, is given without parentheses when the target was monoisotopic or when enriched (or depleted) material was used to establish the identity of the reacting isotope. It is given in parentheses when natural material was used but when the identity of the reacting isotope was strongly suggested by its predominating abundance, the observed reaction energy, or the activity or yield of the end product. It is given in parentheses with a question mark when the target A was assigned by systematics, elimination, etc. For instance, "B^{10}(d,p)" means that the proton groups from the deuteron bombardment of B^{10} were identified by comparing effects in B^{10} enriched and natural B samples. "B^{11}(d,p)" means that the assignment to B^{11} was made by using B^{11} depleted and natural B samples. "$C^{(12)}$(d,p)" means that natural C was used to study the reaction, but, because of the 99% abundance of C^{12}, the reaction observed was assumed to take place in that isotope. In the reaction "$Sn^{(116)}$(n,p)13^{s}In", the Sn isotope was identified by the In product. "$Te^{(125?)}$ (d,p)$Te^{(126?)}$" indicates that from the trend of Q values in the region, the experimenters believed that their measured Q most likely belonged to the indicated reaction.

When a method of production of a radioactive nucleus is given, the lowest bombarding energy used by the experimenter is indicated; e.g., Ag(20-Mev p).

The large black dots on the decay schemes are used to indicate experimentally established coincidences. α, β, or γ rays entering a level and dotted at their arrowheads have been shown to be in coincidence with gamma rays leaving the same level and dotted at their origins. In case of a simple cascade, the dots of the incoming and outgoing rays are superimposed. Dashes are used for doubtful radiations or levels.

For the light nuclei, energy levels in the compound nucleus are usually tabulated rather than the resonant energy of the bombarding particle. The binding energy of the bombarding particle in the compound nucleus is taken from the table of F. Ajzenberg, T. Lauritsen, Revs. Modern Phys. 27, 77(1955) for Z < 11, and from P. M. Endt, J. C. Kluyver, Revs. Modern Phys. 26, 95(1954) for Z from 11 to 20.

In 1954, nuclear data, reported at meetings of the American Physical Society, were not tabulated until Physical Review references for the abstracts were available. This year, they will be reported more promptly with references to the Bulletin of the American Physical Society, BAPS, and to the volume number of the Physical Review in which the Bulletin will later be reprinted.

ABBREVIATIONS

a	absorption
a $\beta\gamma$	absorption of β's in coincidence with γ's
a ce	absorption of conversion electrons
a coin	absorption of photoelectrons between counters in coincidence
α	total γ-ray conversion coefficient, N_e/N_γ
$\alpha_K, \alpha_L, \ldots$	γ-ray conversion coefficient for electrons ejected from the K, L, ... shell
$\alpha_0, \alpha_1, \ldots$	α to g.s., first excited state, ... of residual nucleus
B	band spectra method
B(E2)	reduced E2 excitation probability in $barns^2$ (upward transition)
Be(γ,n)	measurement by detection of photoneutrons from Be
B_n, B_p	neutron, proton binding energy, i.e., energy necessary to remove particle from nucleus
$\beta\gamma(\theta)$	angular correlation of β's and γ's in coincidence
calc	calculated from experimental work reported elsewhere
cc	cloud chamber
CcW	Cockcroft Walton accelerator
ce	conversion electrons
chem	chemical separation of product following reaction
Cp	Compton electrons
cryst	crystal spectrometer
d	(1) deuteron, (2) descendant of, (3) days, when used as superscript
d,p(θ)	angular distribution of protons with respect to deuteron beam
D(γ,n),D(γ,p)	measurement by detection of photoneutrons or photoprotons from deuterium
$\overline{E}$	average energy
E_0	resonance energy
$E_\beta, E_\gamma, \ldots$	energy of β ray, energy of γ ray, ...
E_{dis}	disintegration energy
EA	electrostatic analyzer
E1,E2, ...	electric dipole, electric quadrupole, ...
e_A	Auger electron
el	elastic scattering
ϵ	(1) electron capture, (2) fractional transition probability for decay process observed
ϵ_K, ϵ_L	electron capture from K, L shell
$\eta(\theta)$	$[W(\theta) - W(\pi/2)]/W(\pi/2)$, a measure of asymmetry in angular distributions, where $W(\theta)$ is the count at angle θ
f	fission, in abbreviations for methods of production or detection
F-K	Fermi-Kurie β energy distribution plot

$\gamma(\theta,T)$	numbers of γ's as function of angle and temperature
$\gamma\gamma$, $\beta\gamma$, $\alpha\gamma$, $n\gamma$	$\gamma\gamma$, $\beta\gamma$, $\alpha\gamma$, or $n\gamma$ coincidences. (0.123 γ) (0.246 γ, 0.325 γ) means 0.123 γ in coincidence with 0.246 γ and 0.325 γ
g	gyromagnetic ratio
$\gamma^{\pm}$	annihilation radiation
Γ	resonance half-width (the whole width at half-maximum)
GM	Geiger-Müller counter
g.s.	ground state
I	(1) nuclear induction magnetic resonance method
IB	internal bremsstrahlung
ic	ionization chamber
IT	isomeric transition
J	spin in units $h/2\pi$
K/L	α_K/α_L
l	angular momentum of particle absorbed into or picked up from nucleus
Lin	linear accelerator
M	molecular or atomic beam resonance method
m	medium intensity
M1,M2, ...	magnetic dipole, magnetic quadrupole, ...
mb	millibarns
Mic	microwave method
mir	measurement by total reflection of neutron beam from mirror surface
ms	mass spectrometer
μ	(1) magnetic moment in units of nuclear magnetons, (2) micron, 10^{-4} cm
μ_3	magnetic octupole moment in units of nuclear magneton barns
μs	microseconds
ν	neutrino
osc	pile oscillator method
p	(1) proton, (2) predecessor of
pr	electron-positron pair
p res	proton resonance. Magnetic field standardized by means of proton resonance frequency
para	paramagnetic resonance method
parentheses	parentheses are put around values which are given for identification purposes
pc	proportional counter
pe	photoelectrons
ppl	photoplates or emulsions
primes	primes indicate inelastically scattered particles
q	electric quadrupole moment in units of barns
quad res	quadrupole resonance method
Q	reaction energy in Mev
s	(1) spectrometer method, (2) seconds, when used as superscript
s coh	coherent scattering
S	atomic spectra measurement
scin	1 crystal scintillation counter
scin Cp	2 crystal scintillation counter
scin pr	3 crystal scintillation counter
sd	double focusing spectrometer
sl	lens spectrometer
sl ce	conversion electrons measured in lens spectrometer
st	strong
sπ	180° spectrometer
sπ pr	180° pair spectrometer
σ	cross section in barns
σ_0	cross section at resonance energy, E_0
σ_a	absorption cross section
σ_t	total cross section
Σ scin	scintillation counter used to sum energy of transitions in cascade
t	(1) triton, H^3, (2) total cross section when used under σ in cross section list
trans	transmission
T	(1) isotopic spin; (2) temperature
τ	half life in units indicated
τ_1, τ_2	half life of upper, lower state
$\tau_{\beta\beta}, \tau_{\epsilon\epsilon}$	half life for double β, double ϵ decay
τ_γ(E2)	partial half-life for de-excitation by E2 γ transition (downward transition)
th	thermal
VdG	Van de Graaff accelerator
w,vw	weak, very weak
$Y_\gamma, Y_p, \ldots$	yield of γ rays, yield of protons, ...
%	% of disintegrations
†	relative numbers. When used in connection with γ rays, relative numbers of photons, not photons plus conversion electrons, are meant
+,−	even, odd parity when used in connection with level properties

Standard journal abbreviations are used.

RADIOACTIVITY, LEVELS, ABUNDANCES, MOMENTS,

Unassigned activities from proton bombardment

τ (sec)	Target	E_p
0.4	Mg	50
4.5	Mg	80
~0.2	Al^{27}	80
~2.5	Si	20
~1	Si	50
0.2	Ti	80
0.77	Mn^{55}	95
0.55	Fe	50
0.3	Cu	130
1.3	Cu	130
0.15	Zn	100
0.8	Zn	100

M.Tyrén, P.A.Tove, Phys. Rev. 96,773(1954).

ν

μ $< 10^{-7}$
From counting rate in large liquid scintillator near reactor

C.L.Cowan, Jr., F.Reines, F.B.Harrison, Phys. Rev. 96, 1294 (1954).

n^1
0 1
13^m

J 1/2 M
Direct measurement with neutron beam

C.P.Stanford, T.E.Stephenson, S.Bernstein, Phys. Rev. 96, 983 (1954).

H^1
1 0
stable

τ $> 10^{21}$y
From pulse rate in large scintillator of C_7H_8 with 100 ft of rock shielding
τ for bound $p > 10^{22}$ y

F.Reines, C.L.Cowan, Jr., M.Goldhaber, Phys. Rev. 96, 1157 (1954).

He^4
2 2
stable

$H^2(d,p)$ $E_d = 190$
$H^2(d,n)$ H^3,He^3 detected
$\sigma(H^3)/\sigma(He^3) = 0.86 \pm 0.14$ at 30° c.m.

C.S.Godfrey, Phys. Rev. 96, 1621 (1954).

$He^4(\gamma,p)$ $E_\gamma \lesssim 20$ to $\lesssim 40$
σ curve shows max (~1.8 mb) at $E_\gamma \sim 26$
$\int\sigma\, dE = 0.016$ Mev barns
$p,\gamma(\theta)$ has cos θ term ppl

E.G.Fuller, Phys. Rev. 96, 1306 (1954); Phys. Rev. 83, 202A (1951).

He^4
2 2
stable

$H^2(d,p)$ $E_d = 0.15$ to 0.45
$H^2(d,n)$ H^3,He^3 detected, pc
$\sigma(H^3)/\sigma(He^3) < 1$ Ratio decreases with E_d
$d,n(\theta)$ more asymmetric than $d,p(\theta)$

G.Preston, P.F.D.Shaw, S.A.Young, Proc. Roy. Soc. 226A, 206 (1954).

He^5
2 3
$\sim 10^{-21}$s

Levels $He^{(4)}(n,n)$ $E_n = 14.3$ cc
$n,\alpha(\theta)$ results for $\theta = 20°$ to $90°$ agree with Dodder, Gammel curve

D.F.Shaw, Proc. Phys. Soc. 68A, 43 (1955).

Levels $Li^6(t,\alpha)$ $E_t = 0.24$
g.s. s, pc
other ?

K.W.Allen, E.Almqvist, J.T.Dewan, T.P.Pepper, Phys. Rev. 96, 684 (1954).

He^6
2 4
0.83^s

τ 0.799^s *3* $Li^{(7)}(\le 65\text{-Mev }\gamma,p)$

R.M.Kline, D.J.Zaffarano, Phys. Rev. 96, 1620 (1954).

τ 0.85^s *3* Be^9(pile n,α) chem
$\beta,Li^6(\theta)$ gives $-0.5 < G_A/G_T < +0.3, \therefore G_A \sim 0$

B.M.Rustad, S.L.Ruby, Phys. Rev. 97, 991 (1955).

Levels $Li^{(7)}(t,\alpha)$ $E_t = 0.24$
1† g.s. $J = 0^+$ $t,\alpha(\theta)$
8† (1.71) $J = 2^+$

E.Almqvist, T.P.Pepper, P.Lorrain, Can. J. Phys 32, 621 (1954).

Levels $Li^7(t,\alpha)$ $E_t = 0.24$ pc
g.s $Q = 9.79 \pm 0.03$
1.71 *1* $\Gamma < 0.1$?
3.35* ?
*From α's observed at backward angles only

K.W.Allen, E.Almqvist, J.T.Dewan, T.P.Pepper, Phys. Rev. 96, 684 (1954).

He^{6}
2 4
0.83^{s}

Levels $Li^{7}(t,\alpha)$ $E_t = 0.9$
1.71 $\Gamma < 0.1$
3.4 ? $\Gamma < 0.3$

K.W.Allen, E.Almqvist, C.B.Bigham, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), K2(1955).

Li
3

Abundances
Li^{6} 7.98% $Li^{7}/Li^{6} = 11.53 \pm 0.29$
Li^{7} 92.02%
From crystal density and x ray data

D.A.Hutchison, Phys. Rev. 96, 1018 (1954).

Li^{4}?
3 1

τ $\sim 0.4^{s}$ Li(50-Mev p)
See also Be^{6} Be^{9}(50-Mev p)

H.Tyrén, P.A.Tove, Phys. Rev. 96, 773(1954).

Li^{5}
3 2

$He^{4}(p,p)$ $E_p = 9.73$ scin
Graph of $p,p(\theta)$ disagrees with Putnam's

B.Cork, W.Hartsough, Phys. Rev. 96,1267(1954).

$He^{4}(p,p)$ $E_p = 9.76$ ppl
Data for $p,p(\theta)$ agree with Putnam's

J.M.Williams, S.W.Rasmussen, Phys. Rev. 98 (1955);
BAPS 30, #1 (New York), L3.

Level $Li^{6}(p,d)$ $E_p = 18.6$ pc, scin
g.s. $Q = -3.0$ *2* $\Gamma \sim 1.8$
$l_n = 1$ $p,d(\theta)$
g.s. group asymmetric on low energy side. No other level found up to 6.5

J.G.Likely, Phys. Rev.98 (1955).
BAPS. 30, #2 (Baltimore) G6.

Level $He^{3}(d,\gamma)$ $E_d = 0.2$ to 2.86
γ 16.6 *2* $\Gamma_\gamma = 11$ ev
$E_0 = 0.45$ *4* $\sigma_0 = 0.6$
$d,\gamma(\theta) \sim$ isotropic at $E_d = 0.58$

J.M.Blair, N.M.Hintz, D.M.Van Patter, Phys. Rev. 96, 1023 (1954).

Level $H^{2}(He^{3},p)$ $E_{He^3} = 0.1$ to 0.8
16.8 *3* pc, scin
$He^{3},p(\theta)$ isotropic for $E_{He^3} = 0.20, 0.29, 0.35$
$\sigma_{max} = 0.70$ for $E_{He^3} = 0.640$
Resonance in this and $H^{2}(H^{3},p)$ reaction can be fitted with ~same parameters if $J = 3/2+$ is assumed for both.

W.E.Kunz, Phys. Rev. 97, 456 (1955).

Li^{6}
3 3
stable

$n,p(\theta)$ $Li^{6}(n,p)$ $E_n = 14$ ppl
$n,d(\theta)$ $Li^{6}(n,d)$
$n,t(\theta)$ $Li^{6}(n,t)$

G.M.Frye, Jr., Phys. Rev. 93, 1086 (1954).

$n,t(\theta)$ $Li^{6}(n,t)$ $E_n = 1.1, 1.5, 2.0$
ppl

J.B.Weddell, J.H.Roberts, Phys. Rev. 95, 117 (1954).

Level $Li^{6}(p,d)$ $E_p = 18.6$ pc, scin
g.s. $l_n = 1$ $p,d(\theta)$

J.G.Likely, Phys. Rev. 98 (1955)
BAPS 30, #2 (Baltimore), G6.

Levels $Li^{7}(He^{3},\alpha)$ $E_{He^3} = 0.9$

Level	Γ	Level	Γ
2.19	<0.1	6.63 *8*	<0.2
3.56 *6**	<0.1	7.40 *10*	0.6
4.3 *2*	?	8.37 *8 ?*	<0.2
5.35 *7*	<0.1	9.3 *2 ?*	0.6
5.6 *2 ?*	2.0		

*Recoil Li^{6} ions show this level emits γ's

K.W.Allen, E.Almqvist, C.B.Bigham, Phys. Rev. 99 (1955); BAPS 30, #3(Washington), K2(1955).

Li^{7}
3 4
stable

Not observed $Li^{7}(n,p)$ $E_n = 14$ ppl
Observed $Li^{7}(n,d)$
$n,t(\theta)$ $Li^{7}(n,t)$

G.M.Frye, Jr., Phys. Rev. 96 1086 (1954).

Level $Li^{(7)}(\alpha,\alpha'\gamma)$ $E_\alpha = 1.9$ scin
(0.478)
$\tau < 3 \times 10^{-13}$s from Doppler shift of γ
$\alpha\gamma(\theta)$ isotropic within 10%

C.W.Li, R.Sherr, Phys. Rev. 96, 389 (1954).

Level $Li^{(7)}(\alpha,\alpha'\gamma)$ $E_\alpha = 5.30$ sl
0.478 *2*
$\tau < 1.3 \times 10^{-13}$s from Doppler shift of γ

V.S.Zhipinel, Izvest. Akad. Nauk Ser. Fiz. SSSR 18, 65 (1954).

Levels $Li^{(7)}(\gamma,\alpha)$ $E_\gamma \leq 31$ ppl
4.7 *1* $J = 5/2$ $\gamma,\alpha(\theta)$
5.5 *1* $J = 5/2$ (3/2, 1/2 ?)
6.8 *1* $J = 5/2$ (3/2, 1/2 ?)
Possible levels at 7.4, 8.3, 9.0
$\sigma(E_\gamma = 4.7) \sim 0.15$ mb

P.Stoll, Helv. Phys. Acta 27, 395 (1954).
P.Erdös, P.Stoll, M.Wächter, V.Wataghin, Nuovo Cim. 12, 639 (1954).

Li^{7}
3 4
stable

Level $Li^{6}(n)$ $E_n = 0.035$ to 4.2
7.46 $E_0 = 0.26$ *1* $\sigma_0 = 10.3$
$J = 5/2-$ $\Gamma_\alpha = 0.06, \Gamma_n = 0.114$

C.H.Johnson, H.B.Willard, J.K.Bair, Phys. Rev. 96, 985 (1954).

Li^{8}
3 5
0.84^{s}

τ 0.841^{s} *4* $Be^{9}(\leq 65\text{-Mev } \gamma, p)$

R.M.Kline, D.J.Zaffarano, Phys. Rev. 96,1620 (1954).

$E_n = 0.4$ to 1.7
Level $Li^{(7)}(n,n' + 0.478\gamma)$
3.22 $\Gamma = 1.14$ scin
$\sigma(E_n)$ fitted assuming either $J = 1+$ or $1-$

J.M.Freeman, A.M.Lane, B.Rose, Phil. Mag. 46, 17 (1955).

Li^{9}
3 6
0.17^{s}

$U^{235}(\gamma, f)$ $E_\gamma \leq 11$
$8 \pm 2 \times 10^{-5}$ delayed n's per fission with
$\tau = 0.15 \pm 0.04^{s}$ tentatively assigned here

P.J.Bendt, F.R.Scott, Phys. Rev. 97, 744(1955).

Be^{6}?
4 2

τ $\sim 0.4^{s}$ Li(50-Mev p)
See also Li^{4} Be(50-Mev p)

H.Tyrén, P. A.Tove, Phys. Rev. 96, 773(1954).

Be^{8}
4 4
$\sim 10^{-16}$s

$Li^{6}(d,t)$ $E_d = 0.4$ to 5.5
$\sigma(E_d \sim 1) = 0.19$, $\sigma(E_d \sim 4) = 0.29$

R.L.Macklin, H.E.Banta, Phys. Rev. 97, 753 (1955); 95, 302A (1954).

Level $B^{(11)}(p,\alpha_1)2\alpha_2$ $E_p = 0.163$
g.s. Q(break-up) = 0.090 *5*
$\alpha_1, \alpha_2(\theta)$ $\tau < 4 \times 10^{-15s}$ $J = 0$

P.B.Treacy, Proc. Phys. Soc. 68A, 204(1955).

Level $Li^{(7)}(p,\gamma)$ $E_p = 1.5$ to 5
19.1 $\Gamma = 0.4$ scin($E_\gamma > 10$)

C.P.Swann, M.A.Rothman, W.C.Porter, C.E.Mandeville, Phys. Rev. 98 (1955). BAPS 30, #1(New York), RA1.

Levels $Li^{(7)}(p,n)$
(19.2) $J = 3+$, $T = 1$
Background due to $J = 1-$ and $J = 2-$, $T = 0$ states
Conclusions from analysis of available data

R.K.Adair, Phys. Rev. 96, 709 (1954).

Be^{9}
4 5
stable

$Be^{9}(n, ?\gamma)$ $E_n = 3.2$ scin
No γ's observed

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

Levels $Li^{7}(He^{3},p)$ $E_{He^3} = 0.72$ scin
g.s.
1.8 *2*
2.4 *2*
3.2 *1*
4.9 *1*
p's distinguished from d's by absorption

C.D.Moak, W.M.Good, W.E.Kunz, Phys. Rev. 96, 1363; 95, 640A (1954).

Levels $Be^{9}(p,p')$ $E_p = 3$ to 6.5 a
g.s.
2.43 *5*
Graph of $d\sigma/d\omega(90°)$ given

G.W.Greenlees, Proc. Phys. Soc. 68A, 97(1955).

Levels $Li^{7}(He^{3},p)$ $E_{He^3} = 0.9$

Level	Γ	Level	Γ
1.81 *1*	<0.4	3.06 *8*	<0.3
2.39 *8*	<0.2	4.74 *8*	1.2
		9.2?	1.2

$B^{10}(t,\alpha)$ $E_t = 0.9$
2.39
3.06

E.Almqvist, K.W.Allen, C.B.Bigham, Phys. Rev. 99(1955); BAPS 30, #3(Washington), K3(1955).

Level? $Li^{7}(d,t)$ $E_d = 1.3$ to 5.5
~ 18.6?
$\sigma(E_d \sim 2.4) = 0.095$, $\sigma(E_d \sim 4) = 0.165$

R.L.Macklin, H.E.Banta, Phys. Rev. 97, 753 (1955).

Be^{10}
4 6
2.5×10^{6}y

Levels $Be^{9}(d,p)$ $E_d = 11.9$
g.s. $l_n = 1$ $d,p(\theta)$
(3.37) $l_n = 1$

F.S.Eby, Phys. Rev. 96, 1355 (1954).

Levels $Be^{9}(d,p)$ $E_d = 5.4$ to 7.4
g.s. Q = 4.586 *8* ST 90°
3.37 *1* st 6.26 *1*
5.96 *1* 7.37 $\Gamma \sim 0.086$
w 6.18 *1* 7.54 $\Gamma \sim 0.010$

J.J.Jung, C.K.Bockelman, Phys. Rev. 96, 1353 (1954); Phys. Rev. 94, 748A (1954).

Be^{10}
4 6
2.5×10^{6}y

Levels $\quad$ $\mathrm{Li}^{(7)}(t,\alpha)$ $\quad$ $E_t = 0.24$
~17.4 $\quad$ $J = 2^+, 2^-$ levels $\quad$ $t,\alpha(\theta)$

E.Almqvist, T.P.Pepper, P.Lorrain, Can. J. Phys. 32, 621 (1954).

B
5

γ $\quad$ $\mathrm{B}(n,?\gamma)$ $\quad$ $E_n = 3.2$ $\quad$ scin

st	0.43	1.41
	0.76	1.61
	1.02	2.0
	1.17	

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

B^{9}
5 4

Level $\quad$ $\mathrm{B}^{10}(\mathrm{He}^3,\alpha)$ $\quad$ $E_{He^3} = 0.9$
2.58 *13*

E.Almqvist, K.W.Allen, C.B.Bigham, Phys. Rev. 99(1955); BAPS 30, #3(Washington), K3(1955).

B^{11}
5 6
stable

Levels $\quad$ $\mathrm{B}^{10}(d,p)$ $\quad$ $E_d = 0.18, 0.29, 0.41, 0.58$
ppl; scin
$d,p(\theta)$

		l_n
6.4†	g.s	1
1.8†	(2.14)	3
7.1†	(4.46)	0
1.3†	(5.03)	2

†$\int d\sigma$ in mb at $E_d = 0.58$. σ's given at other E_d
$d,p(\theta)$ analyzed for stripping and compound nucleus formation

C.H.Paris, F.P.G.Valckx, P.M.Endt, Physica 20, 573 (1954).

Levels $\quad$ $\mathrm{B}^{10}(d,p)$ $\quad$ $E_d = 3.90$ $\quad$ $d,p(\theta)$

g.s.	$l_n = 1$
(2.14)	~isotropic*
(4.46)	$l_n = 1$
(5.03)	~isotropic*
(6.76)	$l_n = 1$

S.A.Cox, R.M.Williamson, Phys. Rev. 99(1955); BAPS 30, #3(Washington), K4(1955); *verbal report.

Levels $\quad$ $\mathrm{Li}^{(7)}(\alpha,\alpha'+0.478\ \gamma)$ $\quad$ $E_\alpha \leq 2.8$

0.11†	9.86	$\Gamma = 0.125$	$J \leq 5/2$ if − $J \leq 3/2$ if +
0.08†	10.23	$\Gamma \sim 0.155$	$J \leq 7/2$

No 10.32 level (< 0.008†)
Correction made for barrier penetration
J from comparison of reduced width with limit
†Peak cross section in barns

C.W.Li, R.Sherr, Phys. Rev. 96, 389 (1954).

B^{12}
5 7
0.03^{s}

γ $\quad$ $\mathrm{B}^{(11)}(d,p\gamma)$ $\quad$ $E_d = 1.05$ $\quad$ scin

2†	0.940
1†	1.64

L.C.Thompson, Phys. Rev. 96, 369 (1954).

C^{11}
6 5
20.4^{m}

Levels $\quad$ $\mathrm{B}^{10}(d,n)$ $\quad$ $E_d = 0.58$ $\quad$ ppl
$d,n(\theta)$

		l_p
2.0†	g.s.	1
0.8†	(1.85)	3?
2.2†	(4.23)	0
0.7†	(4.77)	

†$\int d\sigma$ in mb
$d,n(\theta)$ analyzed for stripping and compound nucleus formation

C.H.Paris, P.M.Endt, Physica 20, 585(1954).

Level $\quad$ $\mathrm{B}^{10}(p,\gamma)$ $\quad$ $E_p = 0.78$ to 1.72
9.77 *4* $\quad$ $\Gamma = 0.57$ $\quad$ scin($E_\gamma \sim 9.7$)
No resonances at $E_p = 0.78$, 0.96, 1.33

T.M.Hahn, Jr., B.D.Kern, G.K.Farney, Phys. Rev. 98 (1955).
BAPS 30, #1(New York), RA2.

C^{12}
6 6
stable

Levels $\quad$ $\mathrm{C}^{(12)}(p,p')$ $\quad$ $E_p = 9.9$

g.s.	$p,p(\theta)$*
(4.43)	$p,p'(\theta)$**

*Diffraction effects observed
**Analyzed for direct collision and compound nucleus formation

G.E.Fischer, Phys. Rev. 96, 704 (1954).

Levels $\quad$ $\mathrm{B}^{(11)}(d,n)$ $\quad$ $E_d = 1.6$ to 4.7
pc scin
g.s.
(4.43)
$d,n(\theta)$ varies markedly with E_d

J.R.Risser, J.Price, C.M.Class, Phys. Rev. 99, (1955).
BAPS 30, #1 (New York), RA3.

Levels $\quad$ $\mathrm{C}^{(12)}(p,p')$ $\quad$ $E_p = 9.5$ $\quad$ ppl

g.s.	$\sigma(\theta)$ has a max. at 100°
(4.43)	σ symmetric about 90°

W.E.Burcham, W.M.Gibson, A.Hossain, J.Rotblat, Phys. Rev. 92, 1266 (1953).

Levels $\quad$ $\mathrm{C}^{(12)}(p,p')$ $\quad$ $E_p = 14$ to 19

g.s.	
(4.43)	σ asymmetric about 90°
(7.65)	
(9.61)	

$p,p'(\theta)$ does not fit direct interaction picture

R.Peelle, Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), RA5.

NRC 55P02 55-3-12

Levels $\quad$ $\mathrm{C}^{(12)}(d,d')$ $\quad$ $E_d = 19$ $\quad$ ppl
g.s.
(4.43)
(9.61)
Group to level at 7.68 not observed
Graphs of $\sigma(\theta)$ given but not analyzed

R.G.Freemantle, W.M.Gibson, J.Rotblat, Phil. Mag. 45, 1200 (1954).

C^{12}
6 [illegible]
stable

Levels $B^{11}(d,n)$ $E_d = 0.85$ ppl
$d,n(\theta)$

	l_p
g.s.	1,2?
4.4	1
7.7	isotropic within 25%
9.6	2
12.7	

A.Graue, Phil. Mag. 45, 1205 (1954).

Levels $B^{10}(He^3,p)$ $E_{He^3} = 0.9$ ppl scin

4.43 *6*	13.31 *6*
7.77 *6*	13.97 *6*
9.61 *6*	15.10 *6*
10.75 *6*	16.04 *6*
11.83 *6*	16.57 *6*
12.76 *6*	

C.B.Bigham, K.W.Allen, E.Almqvist, Phys. Rev. 99(1955); BAPS 30, #3(Washington), K5(1955).

Levels $C^{(12)}(e,e')$ $E_e = 150$ to 188
4.4
7.7
9.7
Resolution 0.2%

J.H.Fregeau, R.Hofstadter, Phys. Rev. 98 (1955).
BAPS 30, #1(New York), RA6.

Level $N^{(14)}(d,\alpha\gamma\gamma)$ $E_d = 0.63$ scin
(7.65)
$(3.2\gamma)(4.4\gamma)(\theta)$ consistent with J = 0, 2, 0

J.Seed, Phil. Mag. 46, 100 (1955).

Levels $C^{(12)}(p,p'3\alpha)$ cc

9.6	20
11.8	25
16	

1/4 events via Be^8 g.s; 1/2 via Be^8 2.9 level

J.L.Need, Phys. Rev. 98, (1955).
BAPS 30, #2 (Baltimore), 67.

γ $B^{(11)}(d,n\gamma)$ $E_d = 10.8$ scin
100† 15.1
$N^{(14)}(d,\alpha\gamma)$ $E_d = 10.8$
3† ~15
$Be^9(\alpha,n\gamma)$ $E_\alpha = 21.7$
6† ~15
Results consistent with assignment of T = 1, J = 1+ state to C^{12}

V.K.Rasmussen, J.R.Rees, M.B.Sampson, N.S.Wall Phys. Rev. 96, 812 (1954).

C^{12}
6 6
stable

γ $C^{(12)}(p,p'\gamma)^*$ $E_p = 30$ to 340
$B^{11}(d,n\gamma)$ $E_d = 18$ to 50
15.2 *2* From T = 1 level? s pr
$^*\sigma$(15.2-Mev γ) at 90° given
γ not produced by $B^{10}(d)$, Be(p), B(p), O(p) for above E_d and E_p nor by Be(170-Mev α)

D.Cohen, B.J.Moyer, H.Shaw, C.Waddell, Phys. Rev. 96, 714 (1954).

Levels $B^{(11)}(p,\gamma)$ $E_p = 0.6$ to 2.0

(16.10)	(18.39)
(17.22)	(19.25)

p, (12-Mev γ)(θ); p, (16-Mev γ)(θ) as f(E_p) show that more than two of above levels are involved in interference scin

H.H.Glvin, G.K.Farney, T.M.Hahn, B.D.Kern, Phys. Rev. 96, 1337; 95, 302A, 641A (1954).

Levels $B^{(11)}(p,\gamma)$ $E_p = 0.5$ to 3.0
16.56 ~16 γ not resonant
p(~12 γ)(θ) gives J = $2^-, 3^+$
17.2 p(~16 γ)(θ) gives J = $1^-, 2^+$
p(~12 γ)(θ) large cos term
18.4 p(~16 γ)(θ) gives J = 2^+
Both γ's weakly resonant

H.E.Gove, E.B.Paul, Phys. Rev. 97, 104(1955).

Level $B^{10}(d,p)$ $E_d = 0.15$ to 0.7
25.36 scin
Irregularities in relative intensities of four longest p groups observed at $E_d = 0.21$

C.H.Paris, F.P.O.Valckx, P.M.Endt, Physica 20, 573 (1954).

C^{13}
6 7
stable

J 1/2 I
μ 0.702198
$\nu(C^{13})/\nu(H^1) = 0.2514431$ *5*
Both nuclei in same molecule

V.Royden, Phys. Rev. 96, 543 (1954).

$C^{(12)}(d,p)$ $E_d = 0.52$ to 0.84
g.s. ppl
Values of $a_1 \ldots a_4$ in $\Sigma a_l P_l(\theta)$ for d,p(θ)

S.Takemoto, T.Dazai, R.Chiba, S.Ito, S.Suganomata, Z.Watanabe, J. Phys. Soc. Japan 9, 447 (1954).

Levels $C^{(12)}(d,p)$ $E_d = 7.00$
g.s. Q = 2.717 *10* sπ 90°
3.090
$\left.\begin{matrix}3.684\\3.855\end{matrix}\right\}\ \Delta Q = 0.170 \pm 0.003$
No 0.70, 4.6 level found (< 0.5% of g.s.)

A.Sperduto, W.W.Buechner, C.K.Bockelman, C.P.Browne, Phys. Rev. 96, 1316 (1954).

C^{13}
6 7
stable

Levels $C^{(12)}(d,p)$ $E_d = 19$ ppl
$d,p(\theta)$

	l_n
g.s.	1?
(3.08)	0
(3.89)	2

R.G.Freemantle, W.M.Gibson, J.Rotblat, Phil. Mag. 45, 1200 (1954).

Levels $B^{11}(He^3,p)$ $E_{He^3} = 0.9$ ppl
scin

3.08 *6*	8.96 *6*
3.77 *6*	10.00 *6*
6.89 *6*	10.99 *6*
7.63 *6*	11.76 *6*

C.B.Bigham, K.W.Allen, E.Almqvist, Phys. Rev. 99(1955); BAPS 30, #3(Washington), K5(1955).

Level $C^{(12)}(d,p)$ $E_d \sim 2.74$
(3.09)
$d,p(\theta)$ studied. Large σ at 180°

M.T.McEllistrem, R.Chiba, R.A.Douglas, D.F. Herring, E.A.Silverstein, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), K9(1955).

Level $C^{(12)}(d,p)$ $E_d = 1.2$
γ (3.09) E1 $e^+e^-(\theta)$ scin

S.Gorodetzky, R.Armbruster, P.Chevallier, A.Gallmann, Compt. rend. 239, 1623 (1954).

Levels $C^{(12)}(n,n)$ $E_n = 1.9$ to 3.9
6.84 $J = 3/2^+ (5/2^+?)$ $n,n(\theta)$
7.67 $J = 3/2^+$
8.29 $J = 3/2^+$
Old results corrected and extended
Phase analyses use σ_t and polarization

P.Huber, R.Budde, Helv. Phys. Acta 27, 512A (1954).

Levels $C^{12}(d,p)$ $E_d = 14.5$ s
7.53 *2* 9.50 *2*
7.64 *2* $\Gamma > 0.1$ 9.90 *2*

J.N.McGruer, E.K.Warburton, R.S.Bender, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), K8 (1955); verbal report.

Levels $C^{(12)}(n,n)$ $E_n = 2.4$ to 3.7

Res.	Level	J	Γ
2.95	7.67	$3/2^+$	0.06
3.65	8.32	$3/2^+$	1.20

Phase shift analysis of $n,n(\theta)$ scin

R.W.Meier, P.Scherrer, G.Trumpy, Helv. Phys. Acta 27, 577 (1954).

C^{14}
6 8
$\sim 5600^y$

Comparison with S^{35} shows β spectrum has allowed shape down to 3 kev pc

A.Moljk, S.C.Curran, Phys. Rev. 96, 395(1954).

C^{14}
6 8
$\sim 5600^y$

β^- 0.155 *1* F-K linear above 0.03
Source thickness $\sim 15\ \mu g/cm^2$ sl

H.H.Forster, A.Oswald, Phys. Rev. 96,1030 (1954).

β^- 0.1585 *5* F-K linear ($E_\beta > 0.007$)
Source thickness $\sim 6\ \mu g/cm^2$

A.V.Pohm, R.C.Waddell, J.P.Powers, E.N.Jensen, Phys. Rev. 97, 432 (1955).

Levels $C^{(13)}(d,p)$ $E_d = 5.0$ to 7.0
g.s. Q = 5.942 *11* sm 90°
6.091
$\left.\begin{matrix}6.723\\6.894\end{matrix}\right\}\Delta Q = 0.171 \pm 0.003$

A.Sperduto, W.W.Buechner, C.K.Bockelman, C.P.Browne, Phys. Rev. 96, 1316 (1954).

Levels $C^{13}(d,p)$ $E_d = 14.5$ s

6.59 *2*	10.50 *2*
7.35 *2*	12.60 *2*
8.32 *2*	12.85 *2* $\Gamma > 0.1$
9.80 *2*	12.96 *2*
10.43 *2*	

J.N.McGruer, E.K.Warburton, R.S.Bender, Phys. Rev. 99(1955); BAPS 30, #3(Washington), K8 (1955).

C^{15}
6 9
2.4[a]

Level $C^{14}(d,p)2.4^aC$ $E_d = 0.6$ to 3.0
g.s. Q = 0.15 *15* scin
Q = 0.12 *5*[a]
Excitation curve gives J(g.s.) = 5/2, not 1/2

J.A.Rickard, E.L.Hudspeth, W.W.Clendenin, Phys. Rev. 96, 1272 (1954); Phys. Rev. 94, 806A (1954); [a]K.R.Spearman, quoted in first reference.

N^{14}
7 7
stable

Hyperfine splitting of ^4S g.s. of atomic N observed but no evidence of q Mic

M.A.Heald, R.Beringer, Phys. Rev. 96, 645 (1954).

$N^{(14)}(\gamma,\alpha)$ $E_\gamma \leq 31$ ppl
σ shows structure for $E_\gamma = 14.5$ to 30 (≤ 0.2mb)

P.Stoll, Helv. Phys. Acta 27, 395(1954).

$C^{(12)}(d,n)N^{13}$ g.s. $E_d \leq 20$
For $E_d > 6$, σ falls more slowly than expected for compound nucleus formation.
$\sigma(E_d = 8) = 0.1$
$C^{(12)}(d,t)$
$\sigma(E)$ suggests pick up

D.H.Wilkinson, Phys. Rev. 99(1955); BAPS 30, #3(Washington), K10(1955).

N^{14}

7 7

stable

Levels $N^{(14)}(p,p')$ $E_p = 9.5$ ppl

100†	g.s.	$\sigma(\theta)$ has a max at ~100°
≤1†	(2.31)	
7†	(3.95)	σ symmetric about 90°
	(4.91)	
	(5.10)	

†Relative numbers of p's at 90°

R.G.Freemantle, D.J.Prowse, J.Rotblat, Phys. Rev. 96, 1268 (1954).

$C^{13}(p,\gamma)$

8.06 level $E_p = 0.554$

γ	17†	1.66	1†	5.7 ?	scin pr
	15†	2.35	100†	8.05	
	13†	4.05			

(4.05 γ) (1.66 γ) (2.35 γ)

4.01 crossover 5 ± 5% of 2.35 γ

B.Hird, C.Whitehead, J.Butler, C.H.Collie, Phys. Rev. 96, 702 (1954).

Levels $N^{(14)}(\alpha,\alpha')$ $E_\alpha = 22$

7.01 *6*	12.5°, 79°, 90°
7.94 *7*	
8.45 *7*	composite?
10.05 *7*	composite?

Levels at 7.4, 7.7, 8.06, 9.49 not observed

D.W.Miller, U.C.Gupta, V.K.Rasmussen, M.B.Sampson, Phys. Rev. 98 (1955). BAPS 30, #1 (New York), RA8.

Level $C^{13}(p,\gamma)$ scin

γ 10.43 $\Gamma = 0.08$ J = 2− $p,\gamma(\theta)$

(Channel spin 0)/(channel spin 1) = 1.5

H.B.Willard, J.D.Kington, J.K.Bair, Phys. Rev. 98 (1955). BAPS 30, #1 (New York), RA7.

Levels $C^{(12)}(d,d)$ $E_d = 2.5$ to 3.4

Level	E_o
12.41	2.51*
12.61	2.74*
12.80	2.96*
12.82	2.99*
12.93	3.12*
13.17	3.39

*Also observed in (d,p)

H.T.McEllistrem, R.Chiba, R.A.Douglas, D.F. Herring, E.A.Silverstein, Phys. Rev. 99 (1955); BAPS 30, #3 (Washington), K9 (1955).

Levels $C^{12}(d,p)$ $E_d = 2.0$ to 5.0

Level	E_o
12.43	2.53
12.60	2.73
12.86	3.02
13.02	3.34
13.63	3.93
14.34	4.76

d,p(θ) shows compound nucleus formation and stripping

T.W.Bonner, A.A.Kraus, Jr., J.T.Eisinger, J.B. Marion, Phys. Rev. 99 (1955); BAPS 30, #3 (Washington, K7 (1955).

N^{15}

7 8

stable

Levels $N^{(14)}(d,p)$ $E_d = 11.9$ scin

g.s. $l_n = 1$ d,p(θ)

(~5.3) forward max observed

F.S.Eby, Phys. Rev. 96, 1355 (1954).

γ $N^{(14)}(d,p\gamma)$ $E_d = 1.05$ scin

5†	0.84
100†	1.88
280†	5.3

L.C.Thompson, Phys. Rev. 96, 369 (1954).

Levels $N^{(14)}(d,p\gamma)$ $E_d = 4$ sl pr

γ	5.26 *4**	8.33 *4*
	6.33 *5*	9.13 *6*
	7.31 *4*	10.04 *4*

*May be from both O^{15} and N^{15}

R.D.Bent, T.W.Bonner, J.H.McCrary, R.F.Sippel, Phys. Rev. 98, (1955). BAPS 30, #1 (New York), X10.

Levels $N^{14}(d,p)$ $E_d = 7$ ppl d,p(θ)

Level	l_n
(5.28)	2
(5.31)	~isotropic
(6.33)	1
(7.16)	2
(7.31)	0
(7.58)	0 + 2
(8.32)	0
(8.57)	0 + 2

R.D.Sharp, A.Sperduto, W.W.Buechner, Phys. Rev. 99 (1955); BAPS 30, #3 (Washington), K11 (1955); verbal report.

Levels $N^{(14)}(d,p)$ $E_d = 5$ to 8 sπ 90°

	ΔQ
5.280 *10*	
6.330 *10*	
7.165 *10*	0.149 *4*
7.314 *10*	0.263 *5*
7.575 *10*	
8.316 *10*	0.258 *4*
8.571 *10*	
9.062 *10*	0.103 *4*
9.165 *10*	
9.834 *10*	0.239 *6*
10.069 *10*	
10.458 *10*	0.085 *3*
10.544 *10*	0.160 *4*
10.705 *10*	0.105 *3*
10.811 *10*	

Level values based on g.s. Q = 8.615

A.Sperduto, W.W.Buechner, C.K.Bockelman, C.P.Browne, Phys. Rev. 96, 1316 (1954).

N^{15}
7 8
stable

Levels $C^{14}(p,n)$ $C^{14}(p,\gamma)$ $E_p = 0.25$ to 1.8 BF_3,scin

J		Γ (kev)	Γ_n (kev)	Γ_p (kev)	$\Gamma_\gamma(\gamma_0)$ (ev)
1/2−	11.30*	12	1.6	10.4	0.25
(1/2+)	11.43**	41	33	8	2.3
1/2+	11.61**	475	5	470	28

*p,n(θ) isotropic, $p\gamma_0(\theta)$ has cos θ term
**p,n(θ) and $p,\gamma_0(\theta)$ isotropic

G.A.Bartholomew, F.Brown, H.E.Gove, A.E.Litherland, E.B.Paul, Phys. Rev. 96, 1154 (1954).

Levels $N^{(14)}(n,n)$ $E_n = 2.6$ to 4.2

	J	
13.2	7/2+	n,n(θ)
13.6	5/2+	
13.8	3/2+	
14.1	5/2+?	
14.3	5/2+	
14.4	7/2+?	
14.7	5/2+	

D.Speiser, Helv. Phys. Acta 27, 427, 159A; P.Huber, H.R.Striebel, Helv. Phys. Acta 27, 157A (1954).

N^{16}
7 9
7.4^s

Level $C^{14}(d,p)2.4°C$ $E_d = 0.6$ to 3.0
12.35 Γ = 0.4 scin($E_\gamma > 2$)
Level value based on g.s. Q = 10.47

J.A.Rickard, E.L.Hudspeth, W.W.Clendenin, Phys. Rev. 96, 1272 (1954).

O^{15}
8 7
2.1^m

τ 2.06^m 2 $O^{(16)}(\leq 25\text{-Mev } \gamma,n)$

R.M.Kline, D.J.Zaffarano, Phys. Rev. 96, 1620 (1954).

τ 2.17^m 5

Level $N^{(14)}(p,\gamma)$ $E_p = 0.8$
7.61 level. Data suggest J = 5/2+

γ	25†	5.3 1	scin pr($E_\gamma > 4.5$)
	100†	6.1 1	
		6.6 1	
		7.6 1	$\Gamma_\gamma = 0.013$ ev

S.Bashkin, R.R.Carlson, E.B.Nelson, Phys. Rev. 98 (1955).
BAPS 30, #1(New York), RA9.

Levels $N^{(14)}(d,n\gamma)$ $E_d = 4$ sl pr

γ	5.26 4*
	6.12 6
	6.81 4

*May be from both O^{15} and N^{15}

R.D.Bent, T.W.Bonner, J.McCrary, R.F.Sippel, Phys. Rev. 98, (1955).
BAPS 30, #1(New York), X10.

O^{16}
8 8
stable

Levels $F^{19}(p,\alpha)$ $E_p = 0.340, 0.873, 0.935$

6.13	$5\times10^{-12} \leq \tau \leq 10^{-11}$s
6.9	$\tau \leq 1.2\times10^{-14}$s
7.1	$\tau \leq 8\times10^{-15}$s

From measurement of Doppler shift

S.Devons, G.Manning, D.P.Bunbury, Proc. Phys. Soc. 68A, 18 (1955).

Levels $F^{19}(p,\alpha)$ $E_p = 0.873$ to 1.431

6.14		J = 3−	p,α(θ)
6.91	Γ~0.006	J = 2+	sγ
7.12	Γ~0.006	J = 1−	

No evidence for doublets at 6.91, 7.12
No level between 7.12 and 8.7
No evidence for 2− level from p,α(θ)

R.W.Peterson, W.A.Fowler, C.C.Lauritsen, Phys. Rev. 96, 1250 (1954); 93, 1085A (1953).

Levels $O^{(16)}(p,p')$ $E_p = 19$ scin 40°-165°

58*	~6		
34*	~7	20*	11.08
28*	8.85	11*	11.51
8*	9.84	6*	12.03
8*	10.34	11*	12.52

*$\int \sigma d\theta$ in mb

R.Sherr, W.F.Hornyak, Phys. Rev. 99(1955); BAPS 30, #3(Washington), K13(1955).

Level $F^{19}(p,\alpha)$ $E_p = 3.1$ to 4.1
8.85 2 J = 2− scin pr
Level indicated by observed γ's

γ	vw	1.71 2
	w	1.92 2
		2.73 2

(2.73γ)(6.14γ) (E_γ 6.3-8)(1.71γ, 1.92γ)

B.J.Toppel, D.H.Wilkinson, D.E.Alburger, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), K12 (1955).

Levels $O^{(16)}(p,p')$ $E_p = 19$ scin

Level	Coincidences
8.85	p(~2.4γ)(2.4γ)(~6,~7γ)
9.85	No γ
11.08	pγ γ(~6, ~7γ)
12.03	pγ?
12.52	p(C^{12} 4.4γ)

W.F.Hornyak, R.Sherr, Phys. Rev. 99(1955); BAPS 30, #3(Washington), K14(1955).

Levels $C^{(12)}(\alpha,\alpha)$ $E_\alpha = 4.0$ to 7.6

	J	Γ	
10.36	4+	0.036	α,α(θ)
11.10 ?		0.010	
11.25	0+	3.3	
11.51	2+	0.11	
11.62	3−	1.6	
12.43	1−	0.23	

J.W.Bittner, R.D.Moffat, Phys. Rev. 96, 374 (1954); 94, 769A (1954).

O^{16}
8 8
stable

Levels $O^{(16)}(\gamma,\alpha)$ $E_\gamma \geq 31$ PPl

14.2 ? 22.6
16.8 23.2 ?
17.3 24.6 ?

J = 2, T = 0 for above levels from $\gamma,\alpha(\theta)$
$\sigma(E_\gamma = 17.6) = 0.15$ mb

P.Stoll, Helv. Phys. Acta 27, 395(1954).

O^{17}
8 9
stable

$C^{13}(\alpha,n)$ $E_\alpha = 5.3$
$\sigma = 10 \pm 1$ mb. n yield 1/30 that from $Be^9(\alpha,n)$

M.E.Nahmias, P.Savel, Compt. rend. 239, 761 (1954).

Levels $O^{(16)}(d,p)$ $E_d = 1.1$ to 2.4
g.s.*
(0.87)**
*Stripping process still present at $E_d = 1.1$
**Stripping process not present at $E_d = 1.1$

J.C.Grosskreutz, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), PA1(1955).

Levels $O^{(16)}(d,p)$ $E_d = 5.0$ to 8.5
g.s. Q = 1.915 *10* sπ 90°
0.875 *12*
3.055 *12*
3.840 *12*

A.Sperduto, W.W.Buechner, C.K.Bockelman, C.P.Browne, Phys. Rev. 96, 1316 (1954).

O^{18}
8 10
stable

Level $O^{17}(d,p)$ $E_d = 0.855$ sd
g.s. Q = 5.821 *10* 61°, 135°
1.986 *13*

K.Ahnlund, Phys. Rev. 96, 999 (1954).

O^{19}
8 11
29.4^s

β^- (2.9) log ft = 4.3
(4.5) log ft = 5.6
γ intensities show log ft $\geq 5.3, \geq 7.3, \geq 6.5$ for transitions to 1.37, 0.112, g.s. F^{19} levels

γ_1 4† 0.112 *2* $\tau \ll 10^{-6}$ s
γ_2 100† 0.200 *2* $\tau = 1.0 \pm 0.2 \times 10^{-7}$ s
γ_3 67† 1.366 *8*

$\gamma_2\gamma_3(\theta)$ supports decay scheme. See F^{19}.
No 0.22 γ (< 0.04†) No 1.59 γ (< 0.03†)

G.A.Jones, W.R.Phillips, C.M.P.Johnson, D.H.Wilkinson, Phys. Rev. 96, 547 (1954).

Levels $O^{18}(d,p)$ $E_d = 0.855$ sd
g.s.? Q = 1.730 *8* 61°, 135°
0.094 *11*
1.468 *10*

G.Wilelmowsky, K.Ahnlund, Phys. Rev. 96, 996 (1954).

F^{17}
9 8
66^s

Levels $N^{(14)}(\alpha,n)$ pc; n thresh
g.s. Q = −4.73 *10*
0.53

W.T.Doyle, A.B.Robbins, Phys. Rev. 98 (1955). BAPS 30, #1(New York), Rall; verbal report.

F^{18}
9 9
1.87^h

$O^{16}(d,\gamma)1.87^h F^{18}$ $E_d = 1.7$
$\sigma \sim 0.01$ mb
$O^{17}(d,n)1.87^h F^{18}$ $E_d = 1.7$
$\sigma \sim 30$ mb

J.W.Butler, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), PA2(1955).

Levels $N^{(14)}(\alpha,p)$ $E_\alpha = 5.30$ ee

	$\alpha,p(\theta)$
6.0	$1-0.64\cos\theta-1.2\cos^2\theta$
7.2	$1-1.1\cos^2\theta$
7.8	$1-1.1\cos^2\theta$

G.S.Mani, R.Pandhi, Proc. Indian Acad. Sci. 40A, 61 (1954).

F^{19}
9 10
stable

Levels $F^{19}(p,p')$ $E_p = 1.431$
0.1088 *8* $p,p'(\theta)$
0.1960 *14*
See Ne^{20} for σ's

R.W.Peterson, W.A.Fowler, C.C.Lauritsen, Phys. Rev. 96, 1250; 94, 1075, 951A (1954).

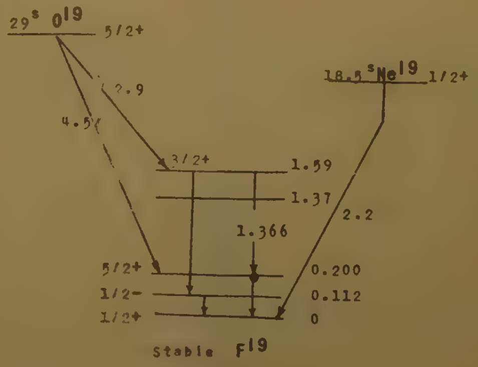
Levels $F^{19}(\alpha,\alpha'\gamma)$ $E_\alpha = 0.6$ to 2.8
$\left.\begin{array}{ll} 0.109 & J = 1/2^- \\ 0.196 & J = 5/2^+ \end{array}\right\}$ $\sigma(E)$; $\alpha,\gamma(\theta)$
Spin assignments consistent with $\sigma(E)$; $\alpha,\gamma(\theta)$; and τ_γ

R.Sherr, C.W.Li, R.F.Christy, Phys. Rev. 96, 1258 (1954); 94, 1076 (1954).

Levels $F^{19}(\alpha,\alpha'\gamma)$ $E_\alpha = 0.8$ to 2.0
γ 0.113 E1, E2 ? from γ yield
0.198* E2 from γ yield/p yield

$F^{19}(\alpha,\alpha'\gamma)$ $E_\alpha = 1.72$ to 1.92
$F^{19}(p,p'\gamma)$ $E_p = 0.71$ to 0.76
γ 0.198 E2 from α yield/p yield

G.M.Temmer, N.P.Heydenburg, Phys. Rev. 96, 426 (1954); BAPS 30, #1 (New York), X5.



G.A.Jones, W.R.Phillips, C.M.P.Johnson, D.H.Wilkinson, Phys. Rev. 96, 547 (1954).

F^{19}
9 10
stable

Level $O^{18}(d,n\gamma)$ scin$(4<E_\gamma<7.5)$
6.03*

Threshold for 6.03 and 4.37 γ's at $E_d = 0.350$
No γ to 0.197 level $(<5\%)$*

H.D.Holmgren, J.W.Butler, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), TA7(1955); *verbal report.

Levels $O^{18}(p,\gamma)$* $E_p = 0.3$ to 2.6 scin
8.49
8.76
9.65
9.83
10.04
10.15
10.22
10.28
10.36

*γ to g.s. or low lying levels

E.L.Hudspeth, I.L.Morgan, J.T.Peoples, Phys. Rev. 99(1955); BAPS 30, #3(Washington), PA3 (1955)

F^{20}
9 11
12^s

γ $F^{19}(d,p\gamma)$ $E_d = 1.05$ scin
1† (0.64)
2.5† (1.06)

$\sigma[F^{19}(d,p)] \gg \sigma[F^{19}(d,n{+}1.63\,\gamma)]$

L.C.Thompson, Phys. Rev. 96, 369 (1954).

Levels $F^{19}(n,\alpha)7.4^s N^{16}$ $E_n = 3.5$ to 6.2

11.1†	10.56		
11.7†	11.05	11.9†	11.91
12.2†	11.39	11.4†	12.20
12.3†	11.73	10.6†	12.38

†σ in mb

N.A.Bostrom, E.L.Hudspeth, I.L.Morgan, Phys. Rev. 99(1955); BAPS 30, #3(Washington), PA4 (1955); verbal report.

F^{21}
9 12
5^s

Levels $F^{19}(t,p)$ $E_t = 0.9$
g.s. $Q = 6.03$ *10* ppl
0.89 *8* 68°, 84°, 130°
3.34 *8* ?
4.01 *6* ?

C.B.Bigham, K.W.Allen, E.Almqvist, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), K5(1955).

Ne
10

Large variations for Ne^{21}/Ne^{20} and Ne^{22}/Ne^{20} in radioactive ores attributed to $O^{18}(\alpha,n)$ and $F^{19}(\alpha,n\beta^+)$

G.W.Wetherill, Phys. Rev. 96, 679 (1954).

Ne^{19}
10 9
18.5^s

β^+ ~100% (2.2) log ft = 3.3
Absence of low energy γ's shows log ft $\geq$ 6.0, $\geq$ 5.5 for transitions to 0.112, 0.200 F^{19} levels

G.A.Jones, W.R.Phillips, C.M.P.Johnson, D.H.Wilkinson, Phys. Rev. 96, 547 (1954).

Ne^{19}
9 10
18.5^s

β^+, $F^{19}(\theta)$ gives $G_S \simeq G_T$ assuming F^{19} configuration is $(d_{5/2})^3{}_{1/2}$
VTP interaction ruled out

D.R.Maxson, J.S.Allen, W.K.Jentschke, Phys. Rev. 97, 109 (1955).

Ne^{20}
10 10
stable

Levels $Ne^{(20)}(p,p')$ $E_p = 9.5$ ppl
g.s. $\sigma(\theta)$ has a max. at 90°
1.58 *1* σ symmetric about 90°
4.20 *1*
4.95 *2*
5.62 *2*

R.G.Freemantle, D.J.Prowse, A.Hossain, J.Rotblat, Phys. Rev. 96, 1270 (1954).

Levels $F^{19}(p,p)$ $E_p = 0.5$ to 2.1 s

(13.438)	$\Gamma_p \ll \Gamma$	
(13.505)	$\Gamma_p \simeq \Gamma$	
(13.659)		
(13.700)	$\Gamma_p \ll \Gamma$	$l_p = 1$
(13.759)	$\Gamma_p \ll \Gamma$	
(14.157)		$l_p = 1$
(14.182)		$l_p = 1$
(14.230)		$l_p = 0$

From preliminary analysis of $p,p(\theta)$ at 4 angles

G.Dearnaley, Phil. Mag. 45, 1213 (1954).

Levels $F^{19}(p, >6\text{-Mev}\ \gamma)$ $E_p = 0.66$ to 1.45 scin$(E_\gamma > 6)$

Res.	Level	Yield*
0.669	13.505	160×10^{-4}
0.874	13.700	3
0.935	13.759	3
0.980	13.801	22
1.090	13.905	34
1.280	14.086	6
1.320	14.125	90
1.365	14.157	12
1.380	14.181	8
1.430	14.229	[illegible]5

* >6-Mev γ's/6-Mev γ's from O^{16}

G.K.Farney, H.H.Givin, B.D.Kern, T.M.Hahn, Phys. Rev. 97, 720 (1955).

Levels $F^{19}(p,\alpha)$ $F^{19}(p,p'\gamma)$ sπ scin

Res.	Level	J*	$\sigma(0.109\gamma)$	$\sigma(0.196\gamma)$
0.873	13.70	2^-	<1	~90
0.935	13.76	1^+	130	1.1
1.290	14.10	3^+		
1.355	14.16	2^-		
1.381	14.18	2^-	24	42**
1.431	14.23	1^+	187**	~7**
			mb	mb

*From $p,\alpha(\theta)$ and $p,p'(\theta)$
**From p,p' rather than $p,p'\gamma$

R.W.Peterson, W.A.Fowler, C.C.Lauritsen, Phys. Rev. 96, 1250, 851A (1954).

Na^{21}
11 10
23^{s}

Levels Ne$^{(20)}$(p,p) E_p = 0.2 to 4.4

	Γ(kev)	J	
4.18	180	3/2-	pc
4.31	6	5/2+	
4.49	17	3/2+	
5.48	110	1/2+	
5.85	25	3/2-	
6.10	6	5/2-,7/2-	
6.53	150	3/2+,5/2+	

For all levels except 6.10 $\Gamma_{el} > 0.7\ \Gamma$
Additional resonances at E_p = 2.7(double ?), 3.42(Γ~20 kev), and 3.552(Γ~2 kev)

W.Haeberli, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), N11(1955); W.Haeberli, A.Galonsky, E.Goldberg, R.Douglas, Phys. Rev. 91, 438A (1953).

Na^{22}
11 11
2.6^{y}

ε 11.0 ± 0.9% $\gamma^{\pm}/1.28\ \gamma$ scin

W.E.Kreger, Phys. Rev. 96, 1554, 854A (1954).

γ (1.28) $\alpha = 6.7 \pm 0.7 \times 10^{-6}$* s
*From comparison with α for 1.33 γ from Co^{60}.

R.D.Leamer, G.W.Hinman, Phys. Rev. 96, 1607 (1954); 90, 370A (1953).

Levels F^{19}(α,n) E_α = 8
g.s Q = 2.0 pc, n thresh
0.4
1.1
2.2

W.[illegible]Doyle, A.R.Quinton, Phys. Rev. 97, 252A (19[illegible]).

Levels Mg$^{(24)}$(d,α) E_d = 5 to 7
g.s. Q = 1.953 *12** 30°, 90° s

0.59	
0.89	2.22 ?
1.53	2.58
1.94	2.98
1.99	3.07

Yield of α's to g.s. and 0.59 level about equal

C.[illegible]Browne; W.C.Cobb, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), PA5(1955); *verbal report.

Na^{23}
11 12
stable

Q +0.11 (or -0.91) M

M.L.Perl, I.I.Rabi, B.Senitzky, Phys. Rev. 97, 838 (1955).

Na^{23}
11 12
stable

Level Na^{23}(α,α'γ) E_α = 1.5 to 3.7
γ 0.446 εB(E2) = 0.041 scin
E2 excitation. Correction for compound nuclear formation by using (α,p γ) yield
Na^{23}(α,α'γ) E_α = 2.00 to 2.22
Na^{23}(p,p'γ) E_p = 0.90 to 0.98
γ 0.446 E2 from α yield/p yield

G.M.Temmer, N.P.Heydenburg, Phys. Rev. 96, 426 (1954); 95, 629A (1954); 98 (1955); BAPS 30, #1 (New York), X5.

Levels F^{19}(α,α' + 0.109 γ) scin
E_α = 0.6 to 2.8

1†	12.17	6†	12.53
2†	12.24	300†	12.59
4†	12.32	450†	12.69
6†	12.36	2.5†	12.75
5†	12.43	60†	12.78
1.4†	12.47		

F^{19}(α,α' + 0.196 γ)

10†	12.36?	180†	12.69
20†	12.53		12.75?
40†	12.59	470†	12.78

F^{19}(α,p + 1.28 γ)

7.9†	11.59	380†	12.24
12.8†	11.63	1200†	12.32
13.8†	11.66		12.36?
34.5†	11.70	320†	12.40
22.5†	11.74		12.43?
24 5†	11.87	800†	12.47
3.4†	12.05	370†	12.50
81.7†	12.08	3400†	12.53
60.7†	12.11	4600†	12.59
60.8†	12.15	2400†	12.69
173†	12.17		12.75?
42†	12.22	5500†	12.78

†peak γ yields/10^{12} α's

R.Sherr, C.W.Li, R.F.Christy, Phys. Rev. 96, 1253 (1954).

Mg
12

γ Mg(n,?γ) E_n = 3.2 scin
0.38 st 1.30
0.59 1.79

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

Mg^{22}?
12 10

τ 0.13^{s} Mg(23-Mev p)
See also Al^{23}

H.Tyrén, P. A.Tove, Phys. Rev. 96, 773(1954).

Mg^{24}
12 12
stable

Levels Mg$^{(24)}$(p,p') E_p = 3.0 to 6.5
Mg$^{(24)}$(d,d') E_d = 4.0 to 7.8
g.s. a
1.37 *4*
Graph of σ(E, 70°) given

G.W.Greenlees, Proc. Phys. Soc. 68A, 97 (1955).

Mg^{24}
12 12
stable

Levels $Mg^{(24)}(p,p')$ $E_p = 9.9$

g.s.		$p,p(\theta)$*
(1.37)		$p,p'(\theta)$**
~4.2		90°
5.1 *1*	Mg^{24}?	
5.9 *1*		
6.3 *1*		pc, scin

*Diffraction effects observed
**Analyzed for direct collision and compound nucleus formation

G.E.Fischer, Phys. Rev. 96, 704 (1954).

Levels $Al^{27}(p,\alpha)$ $E_p = 6.5$ ppl

0.16†	g.s. Q = 1.61 *4*
0.61†	1.38
0.15†	4.18 doublet not resolved

†$d\sigma/d\omega$ at 90°

G.W.Greenlees, Proc. Phys. Soc. 67A, 1107 (1954).

Level $Na^{23}(p,\gamma)$

11.99 level $E_p = 0.31$

γ	11†	1.38 *2*		scin
	6†	4.11 *5*	double ?	scin pr
	1.3†	6.7 *2*		
	8†	7.7 *1*		
	7†	10.6 *2*		

No 2.76 γ

B.Hird, C.Whitehead, J.Butler, C.H.Collie, Phys. Rev. 96, 702 (1954).

Levels $Na^{23}(p,\gamma)$ scin
$Na^{23}(p,\alpha)$ s

11.98 level $E_p = 0.287$

$Y_\alpha = 0.2$ $Y_\gamma < 0.05$

12.00 level $E_p = 0.310$

γ	18†	1.38	3.5†	6.75
	4.4†	2.88	15†	7.75
	2.7†	4.0	10†	10.5
	13†	4.24		

$Y_\alpha < 0.2$ $Y_\gamma = 0.37$

12.03 level $E_p = 0.338$

$Y_\alpha = 0.17$ $Y_\gamma < 0.01$

12.20 level $E_p = 0.515$

γ	12†	1.39	1.2†	7.1
	0.6†	2.86	2.4†	8.1
	1.5†	4.23	10†	10.8

$Y_\alpha < 0.04$ $Y_\gamma = 0.16$

12.27 level $E_p = 0.593$

γ	20†	1.38	12.7†	4.24
	8†	1.64*	6.1†	7.01
	10†	2.86	19†	8.09
	3†	3.93	10†	10.8

*Assigned to Ne^{20} $Y_\alpha = 84$ $Y_\gamma = 0.85$

(CONTINUED)

Mg^{24}
12 12
stable

12.35 level $E_p = 0.679$

γ	32†	1.38	7†	5.5
		1.6*	19†	7.09
	14†	2.84	39†	8.15
	10†	3.91	10†	10.9
	28†	4.23		

*Assigned to Ne^{20} $Y_\alpha < 0.13$ $Y_\gamma = 1.09$
$Y_\alpha, Y_\gamma = \alpha,\gamma$ reaction yield per 10^{10} protons
(~10.6 γ) (1.38 γ) (~8.0 γ) (4.24 γ, ~2.8 γ)
(1.38 γ) (~7.0 γ, ~8.0 γ)

F.C.Flack, J.G.Rutherglen, P.J.Grant. Proc. Phys. Soc. 67A, 973 (1954).

Levels $Na^{23}(p,\gamma)$ $E_p = 0.5$ to 1.0

		E_o
10†	12.194	0.5120 *20*
30†	12.210	0.5923 *20*
100†	12.367	0.6770 *20*
45†	12.415	0.7430 *20*
90†	12.540	0.8737* *20*

*Not $F^{19}(p,\alpha\gamma)$ resonance (< 2×10^{-4}% F present)

K.Nybö, T.Grotdal, Nature 175, 130 (1955).

Levels Na^{23}(p, > 8-Mev γ)

12.276 $E_p = 0.55$ to 1.45
12.681 scin(E_γ > 8)
12.830
12.863

G.K.Farney, H.H.Givin, B.D.Kern, T.M.Hahn, Phys. Rev. 97, 720 (1955).

Levels $Na^{23}(p,\alpha_o)$ $E_p = 1.0$ to 1.9
pc

	J	
12.673	3-	p $\alpha(\theta)$
12.751		
12.793	0+	
12.821	2+	
12.936		
13.43 double ?		

P.H.Stelson, Phys. Rev. 96, 1584 (1954).

Al^{23}? τ 0.13^s Mg(23-[illegible] p)
13 10
See also Mg^{23}

H.Tyrén, P.A.Tove, Phys. Rev. 96, 773(1954).

Al^{25} τ 7.2^s Mg^{24}(825-kev p,γ)
13 12
7.6^s

D.W.Green, J.C.Harris, J.N.Cooper, Phys. Rev. 96, 817A (1954).

Levels $Mg^{24}(p,\gamma)$ $E_p = 0.2$ to 0.7

Level	E_o	
2.51	0.224 *15*	scin
2.69	0.421 *15*	

J.C.Kluyver, C. Van der Leun, P.M.Endt, Physica 20, 1287 (1954).

Al^{25}
13 12
7.6^s

Levels $Mg^{24}(p,\gamma)$ E_p = 0.8 to 2.1

	J	Γ_γ(ev)	p,$\gamma(\theta)$
(3.09)	3/2−	0.16	scin
(3.72)*	7/2−	0.008	
(3.85)	1/2−	0.298	
(3.88)	5/2+	0.03	
(4.22)	3/2+	~40	

*Observed 0.85, 0.95, 1.34, 1.91, 3.72 γ's

E.B.Paul, G.A.Bartholomew, H.E.Gove, A.E. Litherland, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), PA8(1955); verbal report.

Al^{26}
13 13
6.7^s

τ_1 6.4^S Mg^{25}(563,720-kev p,γ)

D.W.Green, J.C.Harris, J.W.Cooper, Phys. Rev. 96, 817A (1954).

β^+ 3.20 *5* sl

R.W.Kavanagh, W.R.Mills, R.Sherr, Phys. Rev. 97, 248 (1955); Phys. Rev. 98 (1955); BAPS 30, #1 (New York), RA12 (1955).

Al^{26}
13 13
~10^{6y}

τ_2	~10^{6y}	Mg(15-Mev d)	chem
β^+ ?	~1		a
γ	0.5 (annihilation?)		scin
	1.9		

J.R.Simanton, R.A.Rightmire, A.L.Long, T.P.Kohman, Phys. Rev. 96, 1711 (1954).

Levels $Na^{23}(\alpha,n)$

g.s.	Q = −2.9		pc
0.3*		1.9	n thresh
1.0		2.5	
1.4		3.0	

*$\gamma^\pm$ first appears at Q = −3.2 scin

W.T.Doyle, A.B.Robbins, Phys. Rev. 98 (1955). BAPS 30, #1 (New York), RA11; verbal report.

Resonances $Mg^{25}(p,\gamma)$

E_0		γ yield	β^+ yield
0.3167	*7*	70	100
0.3915	*5*	140	400
0.4365	*4*	200	< 20*
0.4956	*6*	180	350
0.5134	*7*	155	320
0.5304	*7*	92	220

*Suggests 0.4365 resonance de-excites preferentially to long-lived Al^{26} g.s.

S.E.Hunt, D.A.Hancock, Phys. Rev. 97, 567 (1955).

Capture γ's $Mg^{25}(p,\gamma)$ E_p = 0.3 to 0.7

6.62 level E_0 = 0.321 *15* $\Gamma_\gamma(2J+1)$ = 0.3ev

27†	0.420	*5*		3.40	*6* ?	scin
6†	0.836	*20*	18†	4.82	*4*	
	1.34	*3*	18†	6.22	*5*	
	2.68	*6*	7†	$\gamma^\pm$		

(CONTINUED)

Al^{26}
13 13
~10^{6y}

6.69 level E_0 = 0.395 *15* $\Gamma_\gamma(2J+1)$ = 0.6ev

17†	0.421	*5*		2.78	*5*
9†	0.829	*8*		3.48	*8*
4†	1.002	*15*	18†	4.61	*7*
	1.34	*3*	4†	6.21	*6*
	1.68	*6*	≤12†	$\gamma^\pm$	
	2.06	*6*			

6.73 level E_0 = 0.441 *15* Γ_γ = 0.08ev J = 4−

19†	0.415	*5*	8†	4.70	*10*
	1.33	*2*	6†	6.28	*12*
	1.84	*4*	25†	6.77	*8*
	2.35	*7* ?	≤21†	$\gamma^\pm$	
	3.82	*6*			

E_0 = 0.501 *15* Not resolved
E_0 = 0.518 *15* $\Gamma_\gamma(2J+1)$ = 0.8ev

41†	0.419	*5*	10†	4.22	*6*
7†	0.817	*8*	12†	4.72	*4*
3†	0.999	*15*	4†	5.04	*7*
	1.34	*3*	10†	6.36	*5*
	2.36	*6*	≤37†	$\gamma^\pm$	
	2.72	*8*			

6.85 level E_0 = 0.580 *15* $\Gamma_\gamma(2J+1)$ = 1.5ev

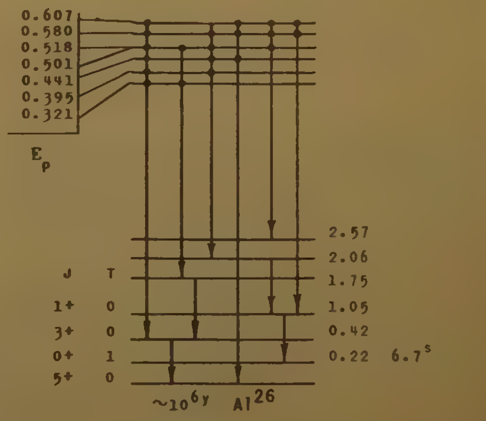
25†	0.423	*7*	22†	4.27	*4*
9†	0.820	*4*	~7†	4.92	*8*
4†	1.011	*15*	~3†	5.82	*10*
	1.34	*2*	18†	6.44	*4*
	1.87	*6*	~3†	6.80	*8*
	2.41	*7* ?	25†		
	2.85	*5*			

6.89 level E_0 = 0.607 *15* $\Gamma_\gamma(2J+1)$ = 1.1ev

27†	0.412	*7*		2.94	*6*
10†	0.823	*8*	25†	4.34	*5*
6†	0.995	*15*	~7†	4.84	*8*
	1.35	*3*	~3†	5.79	*10*
	1.63	*3*	19†	6.47	*5*
	1.87	*4*	~3†	6.81	*10*
	2.05	*6*	27†	$\gamma^\pm$	
	2.25	*4*			

6.95 level E_0 = 0.667 *15* $\Gamma_\gamma(2J+1)$ = 0.3ev
6.97 level E_0 = 0.688 *15* $\Gamma_\gamma(2J+1)$ = 1.6ev

†Intensity as % of all γ's with E_γ > 1



J.C.Kluyver, C.Van der Leun, P.M.Endt, Physica 20, 1287 (1954); Phys. Rev. 94, 1795 (1954).

Al^{26}
13 13
~10^{6}y

Capture γ's Mg^{25}(p,γ) scin

6.98 level E$_o$ = 0.697

0.416

7.01 level E$_o$ = 0.730 high $\gamma^{\pm}$ yield

	0.416	1.44 *3*
3†	0.833 *6**	2.46 *3*
2†	1.022 *6**	5.00 *5**

7.20 level E$_o$ = 0.933 high $\gamma^{\pm}$ yield

0.833	1.022

7.23 level E$_o$ = 0.958 low $\gamma^{\pm}$ yield

2†	0.416 *4**	1†	2.08 *2***
2†	1.67 *2**		*5*

E$_o$ = 0.990
E$_o$ = 1.046 } high $\gamma^{\pm}$ yield
E$_o$ = 1.086

0.416	1.022
0.833	

*In prompt coincidence (delay < 4$^{\mu s}$)
**Not in coincidence with 0.416 γ

R.W.Kavanagh, W.R.Mills, R.Sherr, Phys. Rev. 97, 248 (1955); Phys. Rev. 98 (1955); BAPS 30, #1 (New York), RA12 (1955).

Al^{27}
13 14
stable

γ Al^{27}(n,n'γ) E$_n$ = 3.2 scin

0.05	1.20
0.89	1.70
1.05	2.2

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

Levels Al^{27}(p,p') E$_p$ = 5.64 to 8.45 $\sigma\pi$ 90°

0.842	4.054	5.425
1.013	4.403	5.491
2.213	4.505	5.544
2.732	4.576	5.659
2.977	4.807	5.821
3.001	5.150	5.951 ?
3.677	5.242	
3.954	5.410	

No 5.00 or 5.11 level (peaks due to C^{12})
No other level below 5.3 (yield < 5% of 0.842 level)
All values ± 0.006 Resolution 0.015

C.P.Browne, S.F.Zimmerman, W.W.Buechner, Phys. Rev. 96, 725 (1954).

Levels Na^{23}(α,p + 1.83 γ). E$_\alpha$ = 1.8 to 3.7 scin

11.77	12.69
11.93	12.72
12.08	12.79
12.24	12.85
12.28	12.90
12.35	13.00
12.49	13.08
12.57	13.15

G.M.Temmer, N.P.Heydenburg, Phys. Rev. 96, 426 (1954).

Al^{27}
13 14
stable

Levels Al^{27}(p,p') E$_p$ = 4.9 ppl

62†	g.s.	1.2†	2.22
0.56†	0.83 *10*	0.84†	3.01
1.4†	1.01		

†dσ/dω in mb/sterad at 45°
Possible level between 2.2 and 3.0

K.B.Mather, Australian J. Phys. 7, 658 (1954).

Levels Mg^{26}(p,γ) E$_p$ = 0.3 to 0.7

Level		E$_o$	
8.550	w	0.300 *15*	scin
8.588		0.340 *15*	
8.702		0.458 *15*	

J.C.Kluyver, C.Van der Leun, P.M.Endt, Physica 20, 1287 (1954).

Levels Mg^{26}(p,γ)

Level	E$_o$
8.587	0.3385 *5*
8.698	0.4542 *3*

S.E.Hunt, D.A.Hancock, Phys. Rev. 97, 567 (1955).

Al^{29}
13 16
6.6^{m}

γ 89% 1.28 Si$^{(29)}$(n,p) scin
9% 2.43
No 2.03 γ (< 4%)
No 1.15 γ (< 11%) No $\gamma\gamma$ $\gamma\gamma$ scin

H.Roderick, O.Lönsjö, W.E.Meyerhof, Phys. Rev. 97, 97 (1955); 90, 371A (1953).

Si^{26}?
14 12

τ 1.7^{s} Al^{27}(23-Mev p)

H.Tyrén, P.A.Tove, Phys. Rev. 96, 773(1954).

Si^{28}
14 14
stable

Level Si^{28}(p,p'γ) E$_p$ = 3.1
γ 1.76 *2* scin

H.O.Cohn, J.K.Bair, J.D.Kington, H.B.Willard, Phys. Rev. 99(1955); BAPS 30, #3(Washington), PA10 (1955); verbal report.

Si^{29}
14 15
stable

Levels Si$^{(28)}$(d,pγ) E$_d$ = 2.8 scin

γ	6†	1.28	2†	3.07
	4†	2.03	10†	4.93
	1†	2.43	4†	6.38

H.Roderick, O.Lönsjö, W.E.Meyerhof, Phys. Rev. 97, 97 (1955).

Levels Si^{28}(d,pγ) E$_d$ = 1.35 scin

γ	1.25	3.08
	2.04	~4.9

L.C.Thompson, Phys. Rev. 96, 369 (1954).

P^{28}
15 13
0.28^s

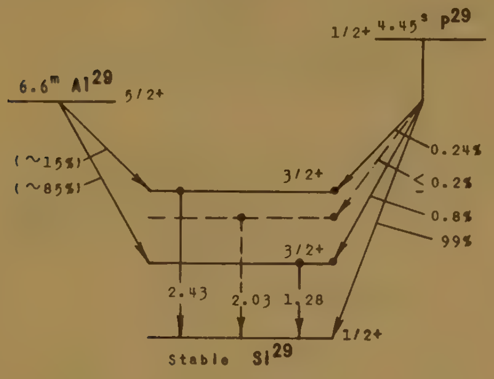
τ 0.27^s Si(20-Mev p)

H.Tyrén, P.A.Tove, Phys. Rev. 96, 773 (1954).

P^{29}
15 14
4.45^s

τ		4.45^s *5*	$Si^{(28)}$(2.8-Mev d,n)
β^+	98.8%	3.945 *5*	sl
γ	0.8%	1.28	$\gamma^{\pm}\gamma/\gamma^{\pm}$, scin
	$\leq$0.15%	2.03 ?	
	0.2-0.5%	2.43	

$(1.28\gamma, 2.03\gamma?, 2.43\gamma)\gamma^{\pm}$
No higher energy γ's detected



M.Roderick, O.Lönsjö, W.E.Meyerhof, Phys.Rev. 97, 97 (1955); 90, 371A (1953).

Levels	$Si^{28}(p,p'+1.78\gamma)$	E_p = 3 to 5
	5.72	6.82 0°, scin
	5.95	7.01 (double?)
	6.18	7.25
	6.31	7.44

H.O.Cohn, J.K.Bair, J.D.Kington, H.B.Willard, Phys. Rev. 99(1955); BAPS 30, #3 (Washington) PA10 (1955); verbal report.

P^{30}
15 15
2.5^m

τ 2.55^m *5*

Levels $Si^{29}(p,\gamma)$ E_p = 0.3 to 1.2

E_p	Level	γ's
0.326	5.83	
0.414	5.91	0.69, 5.9,
0.696	6.18	0.69, 1.25, 2.46, 2.67 4.21
0.727	6.21	0.69, 1.44, 2.24, 3.27
0.917	6.40	0.69, 1.44, 1.98, 4.40 5.65
0.956	6.44	1.44?

S.Milani, J.N.Cooper, J.C.Harris, Phys. Rev. 99(1955); BAPS 30, #3(Washington), PA11(1955); verbal report.

P^{31}
15 16
stable

Level ? $P^{31}(p,?\gamma)$ E_p = 1.4 to 3.4
γ 1.26 *15* scin
No evidence for other P^{31} low-lying levels

J.W.Olness, H.W.Lewis, Phys. Rev. 99(1955); BAPS 30, #3(Washington), TA1(1955).

P^{31}
15 16
stable

γ		$P^{31}(n,?\gamma)$	E_n = 3.2	scin
		1.0	1.75	
	st	1.24	2.1	
		1.60		

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

P^{32}
15 17
14.3^d

β^- 1.712 *8* $P^{31}(n,\gamma)$ s
F-K linear (E_β > 0.06)

N.M.Anton'eva, A.A.Bashilov, B.S.Dzhelepov, V.I.Orlov, Izvest. Akad. Nauk Ser. Fiz. SSSR 18, 93 (1954).

Internal bremsstrahlung energy yield per β is 2.87×10^{-3} mc^2 (21% greater than theoretical value). Spectral shape disagrees with theory for E > 600 kev. scin

K.Lidén, N.Starfelt, Phys. Rev. 97, 419 (1955).

$e^+/e^- \leq 1.5\times10^{-9}$ $\gamma^{\pm}\gamma^{\pm}$

J.S.Greenberg, M.Deutsch, Phys. Rev. 99(1955); BAPS 30, #3(Washington), X6 (1955).

S^{31}
16 15
2.4^s

Levels	$P^{31}(p,n)$	E_p = 17.5
	g.s. Q = -6.03 *15*	
	1.13 *20*	4.60 *15*
	2.23 *15*	6.20 *20*
	3.29 *15*	ppl 30°, 90°, 150°

g.s. n's peaked in forward direction

A.Rubin, F.Ajzenberg, J.B.Reynolds, Phys. Rev. 98 (1955). BAPS 30, #1(New York), RA14.

S^{32}
16 16
stable

Capture γ's	$P^{31}(p,\gamma)$	E_p = 1.30	
	0.9 ?	4.4	scin
	2.25	7.8 *4*	
	2.56	9.8 *4*	
	3.8		

$(E_\gamma > 1)(2.25\gamma, 3.8\gamma, 4.4\gamma)$
$(E_\gamma > 4)(0.9\gamma?, 2.25\gamma)$

B.D.Kern, L.W.Cochran, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), PA12(1955); verbal report.

Level $S^{(32)}(e,e')$ E_e = 150 to 188
6.8

J.M.Fregeau, R.Hofstadter, Phys. Rev. 98(1955). BAPS 30, #1 (New York), RA6; verbal report.

Levels $P^{31}(p,\alpha)$ E_p = 1.0 to 2.5

	Level	E_o	Γ(kev)	Γ_γ
22*	10.33	1.52	9	
25*	10.45	1.64	~5	
43*	10.70	1.90	27	observable
37*	10.83	2.03	18	observable

*σ(90°) in mb
12 additional resonances found with Γ < 4 kev

R.L.Clarke, E.Almqvist, E.B.Paul, Phys. Rev. 99(1955); BAPS 30, #3(Washington), TA2(1955).

S^{32}
16 16
stable

Levels $P^{31}(p,?\gamma)$ $E_p = 1.4$ to 3.4
11.1-12.2

21 resonances for 1.26 γ for $E_p > 2.3$ from (p,p')?
Resonances for 1.8 γ for $E_p > 2.47$ from (p,α)?

J.W.Olness, H.W.Lewis, Phys. Rev. 99(1955); BAPS 30, #3(Washington), TA1(1955).

S^{34}
16 18
stable

Levels $P^{31}(\alpha,p)$ $E_\alpha = 8.1$ scin

g.s. Q = 0.5	
0.7 ?*	3.0 ?
2.1	3.6 ?

*Assignment to S^{34} uncertain

G.F.Pieper, G.S.Stanford, P. von Herrmann, Phys. Rev. 98 (1955). BAPS 30, #1(New York) RA13.

S^{35}
16 19
87^d

β^- (0.167) DC
After instrumental corrections F-K plot linear ($E_\beta > 0.005$)

A.Moljk, S.C.Curran, Phys. Rev. 96, 395(1954)

β^- 0.165 5 sl
Includes correction of -0.002 for 3% resolution

L.Feuvrais, T.Yuasa, Compt. rend. 239, 1627 (1954).

Internal bremsstrahlung energy yield per β is 2.23×10^{-5} mc^2 (35% greater than theoretical value). Spectral shape also shows departure from theory. scin

M.Starfelt, N.L.Svantesson, Phys. Rev. 97, 708 (1955).

K vacancy $/\beta = 2.3 \times 10^{-3}$ 7 DC

W.Rubinson, J.J.Howland, Jr., Phys. Rev. 96, 1610 (1954).

Cl^{32}
17 15
0.31^s

τ 0.28^s S(23-Mev D)

M.Tyrén, P.A.Tove, Phys. Rev. 96, 773(1954).

Levels $S^{32}(p,n)$ $E_p = 17.5$ ppl 90°, 150°
1.0
1.4
2.0

F.Ajzenberg, A.Rubin, J.G.Likely, Phys. Rev. 99(1955); BAPS 30, #3(Washington), TA3(1955); verbal report.

Cl^{34}
17 17
1.53^s

τ_2 1.53^s 2 $Cl^{(35)}$ ($\leq$ 22-Mev γ,n)

R.M.Kline, D.J.Zaffarano, Phys. Rev. 96, 1620 (1954).

Cl^{34}
17 17
1.53^s

Levels $S^{34}(p,n)$ $E_p = 17.5$ ppl 90°, 150°

g.s. ? Q = 6.1	
1.1	4.6
1.9	5.7 ?
2.7	7.2 ?
3.7	

n group with Q = -5.0 also found in S target containing C and O

F.Ajzenberg, A.Rubin, J.G.Likely, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), TA3(1955); verbal report.

Cl^{35}
17 18
stable

Levels $S^{(32)}(\alpha,p)$ $E_\alpha = 8.1$ scin
g.s. Q = -2.3
0.7 ?
1.1
1.7 ?

G.F.Pieper, G.S.Stanford, P. von Herrmann, Phys. Rev. 98 (1955). BAPS 30, #1 (New York), RA13.

Cl^{36}
17 19
4.4×10^{5y}

μ +1.32 6 Mic

P.C.Fletcher, L.C.Aamodt, Phys. Rev. 99(1955); BAPS 30, #3(Washington), BA10(1955).

μ +1.2838 2 I

P.B.Sogo, C.D.Jeffries, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), BA9(1955).

Resonances $Cl^{35}(n)$ $E_n = 2$ to 200 kev Li(p,n)

E_o (kev)	Γ (kev)
26.5	0.34
141	
190	

L.A.Toller, J.R.Patterson, H.W.Newson, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), F1 (1955).

Cl^{38}
17 21
37.3^m

Resonances $Cl^{37}(n)$ $E_n = 2$ to 200 kev Li(p,n)

E_o (kev)	Γ (kev)
8.8	0.09
26.5	0.33
47.4	0.20
55.5	0.18
65.0	0.18
94.2	0.80
141	
190	

L.A.Toller, J.R.Patterson, H.W.Newson, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), F1 (1955).

A
18

A^{36}/A^{38} variation of > 300% in radioactive ores attributed to $Cl^{35}(\alpha,p)$

G.W.Wetherill, Phys. Rev. 96, 679 (1954).

A^{37}
18 19
34^d

E_{dis} 0.812 8 recoil

O.Kofoed-Hansen, Phys. Rev. 96, 1045 (1954).

A^{37}
18 19
34^d

E_{recoil} (A^{37} ions) = 9.8 ±0.7 ev
Consistent with $E_\nu = E_{dis} = 0.816$

A.H.Snell, F.Pleasonton, Phys. Rev. 97, 246 (1955); Phys. Rev. 98 (1955); BAPS 30, #1 (New York), N6 (1955).

A^{40}
18 22
stable

Levels $A^{(40)}(p,p')$ $E_p = 9.51$ ppl
g.s. $\sigma(\theta)$ has a max. at 120°
1.48 *2* σ asymmetric about 90°

R.G.Freemantle, D.J.Prowse, A.Hossain, J.Rotblat, Phys. Rev. 96, 1270 (1954).

K^{38}
19 19
0.94^s

τ_1 0.935^s *25* $K^{(39)}(\leq 22\text{-Mev } \gamma,n)$

R.M.Kline, D.J.Zaffarano, Phys. Rev. 96, 1620 (1954).

K^{39}
19 20
stable

μ 0.39094 *8* KF I
$\nu(K^{39})/\nu(N^{14}) = 0.64588$ *6*

L.C.Brown, D.Williams, Phys. Rev. 98 (1955). BAPS 30, #2 (Baltimore), G3.

Levels $A^{36}(\alpha,p)$ $E_\alpha = 7.4$ ppl
g.s. Q = −1.12 ±0.03*
2.48 *3**
2.88 *3**

R.B.Schwartz, J.W.Corbett, W.W.Watson, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), TA4 (1955); *verbal report.

K^{40}
19 21
1.3×10^{9y}

τ_β 9.6×10^{8y} *6* 42 β's/sec/g K

A.Mée, A.Coche, P.Keller, M.Jarovoy, M.Week, Ann. géophys. 10, 19 (1954).

$\epsilon/\beta = 0.085 \pm 0.005$
From A^{40}/K^{40} measurements using Pb/U ages and assuming 29.5 β's/sec/gm K

G.J.Wasserburg, R.J.Hayden, Phys. Rev. 97, 86 (1955).

K^{42}
19 23
12.5^h

γ 10†* (0.309)
100†* (1.51)
$\gamma\gamma(\theta)$ J = 4, 2, 0
*Disagrees with results of Lazar and Bell [see NSA 8, 24B (1954)]

V.Cappeller, R.Klingelhöfer, Z. Naturf. 9a, 1052 (1954).

K^{42}
19 23
12.5^h

Resonances $K^{41}(n)$ E_n = 2 to 120 kev

E_o (kev)	Γ(kev)	Li(p,n)
10		
23		
39	0.9	
58		
86		
110		

L.A.Toller, J.R.Patterson, H.W.Newson, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), F1 (1955).

K^{43}
19 24
22^h

β^- 20% 0.24 Ta^{181}(340-Mev p) a
80% 0.80
γ 100† 0.375 *10* scin
~100† 0.615 *10*

W.E.Nervik, G.T.Seaborg, Phys. Rev. 97, 1092 (1955).

Levels $A^{40}(\alpha,p)$ $E_\alpha = 7.4$ ppl
g.s. Q = −3.18 ±0.03*
0.62 *3**
1.12 *5**
$\sigma[A^{40}(\alpha,p)]/\sigma[A^{36}(\alpha,p)] \sim 1/35$

R.B.Schwartz, J.W.Corbett, W.W.Watson, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), TA4 (1955); *verbal report.

Ca^{39}
20 19
0

τ 0.90^s *1* $Ca^{(40)}(\leq 19.5\text{-Mev } \gamma,n)$

R.M.Kline, D.J.Zaffarano, Phys. Rev. 96, 1620 (1954).

Ca^{40}
20 20
stable

Level $Ca^{(40)}(p,p' + e^+e^-)$ $E_p = 4.84$
3.46 *10* J = 0 sl pr

T.W.Bonner, R.D.Bent, J.M.McCrary, Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), X9.

Ca^{42}
20 22
stable

Levels $K^{39}(\alpha,p)$ $E_\alpha = 8.2$
g.s. Q = −0.19 *7* a
1.51 *5* 3.02 *5*
1.95 *7* 3.30 *10**
2.29 *5* 3.75 *7*
2.59 *7* 4.09 *10**
*Observed only with $E_\alpha = 7.75$

J.P.Schiffer, Phys. Rev. 97, 428 (1955).

Ca^{43}
20 23
stable

Levels $Ca^{42}(d,p)$ $E_d = 7$ sm

	Level	l_n
70†*	g.s.	3
<10†	0.37	
40†	0.595	1
80†	0.993	3 (2 possible)
v st	1.95	0*

No 0.84 level (<5†)*
†Relative intensity at peak

C.K.Bockelman, C.M.Braams, W.W.Buechner, D.B. Guthe, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), TA5(1955); *verbal report.

Ca^{44}
20 24
stable

Levels $\mathrm{Ca}^{43}(d,p)$ $E_d = 4.15$
g.s. Q = 9.07 *7* a
1.15
2.28

At 90° $\sigma[\mathrm{Ca}^{40}(d,p)]/\sigma[\mathrm{Ca}^{43}(d,p)] \sim 50$ for g.s. groups and ~100 for 1st excited state groups;
$\sigma[\mathrm{K}^{41}(\alpha,p)]/\sigma[\mathrm{Ca}^{43}(d,p)] \sim 70$ a

$\mathrm{K}^{41}(\alpha,p)$ $E_\alpha = 8.2$
g.s. Q = 0.98 *10* a
1.13 *5* 2.58 *5*
1.92 *5* 2.97 *5*
2.28 *5* 3.17 *5*

J.P.Schiffer, Phys. Rev. 97, 428 (1955).

Ca^{47}
20 27
4.8^d

τ 4.7^d *2* Ca^{46}(slow n,γ) chem
V(380-Mev p) chem
β^- 83% 0.660 *10* sl
17% 1.940 *20*
γ 1+ 0.48 *2* scin
1+ 0.83 *2*
~13+ 1.31 *2*
No 0.150 γ, 0.160 γ, 0.234 γ
(0.48 γ)(0.83 γ) No(1.31 γ) γ scin

L.J.Lidofsky, N.Benczer, V.K.Fischer, Phys. Rev. 99(1955); BAPS 30, #3(Washington), V2 (1955); verbal report.

Ca^{48}
20 28

$\tau_{\beta\beta}$ 1.6×10^{17y} *7* 84% Ca^{48}
$E_{\beta\beta}$ 4.1 *3* scin
$E_{\beta\beta}$ shows peak at 4.1 suggesting $\beta\beta$ decay without ν's

J.A.McCarthy, Phys. Rev. 97, 1234 (1955).

Sc^{40}
21 19
0.22^s

τ $\sim 0.35^s$ $\mathrm{Ca}^{(40)}$(23-Mev p,n)

H.Tyrén, P.A.Tove, Phys. Rev. 96, 773(1954).

Sc^{41}
21 20
0.87^s

Levels $\mathrm{Ca}^{(40)}(d,n)$ $E_d = 4.18$
g.s. Q = -0.60 *5*
0.82* 2.05
1.07* 2.25
1.74 ppl 0°, 30°, 45°, 90°
*Assignment uncertain

M.S.Plendl, F.E.Steigert, Phys. Rev. 98 (1955), BAPS 30, #2 (Baltimore), 68; verbal report.

Sc^{44}
21 23
2.4^d

γ 0.27 $\alpha = 0.139$* E4(M4 ?)

J.W.Blue, E.Bleuler, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), V3(1955); *verbal report.

Sc^{44}
21 23
4.0^h

β^+ 94% 1.47 sl
ϵ 6% $\gamma\gamma^\pm/\gamma^\pm$, Na^{22}
γ 100% 1.159 $\alpha = 6.3\times10^{-5}$ scin
0.12% 2.54
No 1.38 γ (<0.5%)
(1.16 γ) $\gamma^\pm$
Origin of 4% soft e's (attributed to IB; Bruner, Phys. Rev. 84, 282) questioned

J.W.Blue, E.Bleuler, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), V3(1955); verbal report.

Sc^{45}
21 24
stable

Levels $\mathrm{Sc}^{45}(p,p')$ $E_p = 5.03$ sπ
0.377 *5* 1.235 *5*
0.541 *5* 1.409 *5*
0.722 *5* 1.432 *5*
0.972 *5* 1.661 *5*

G.C.Phillips, C.R.Gossett, J.P.Schiffer, P.M.Windham, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), TA8(1955).

Sc^{46}
21 25
84^d

Resonances $\mathrm{Sc}^{45}(n)$ $E_n = 0.0015$ to 5000 ev
-0.13 *3* kev $\Gamma_n = 840 \pm 25$ mv
$\Gamma_\gamma = 250 \pm 10$ mv
3.6 $\Gamma = 180$ ev $\sigma_0\Gamma^2 \sim 3\times10^7$
slow and fast chopper, cryst

H.J.Pattenden, Proc. Phys. Soc. 68A, 104(1955).

Sc^{47}
21 26
3.43^d

β^- 74% 0.450 *5* d 4.8^dCa chem; sl
26% 0.610 *5*
γ 100+ 0.160 *5* scin
No other γ with $E_\gamma > 0.16$ (<0.01+)
β(0.160 γ) scin

L.J.Lidofsky, N.Benczer, V.K.Fischer, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), V2 (1955); verbal report.

Ti
22

Relative abundances

Ti^{46}	7.99	Ti^{49}	5.46
Ti^{47}	7.32	Ti^{50}	5.25
Ti^{48}	73.99		

J.E.Hogg, Can. J. Chem. 32, 1039 (1954).

γ Ti(n,?γ) $E_n = 3.2$ scin
st 0.92
1.30
2.2

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

Ti^{43}
22 21
0.58^s

τ 0.58^S Ti(80-Mev p)

H.Tyrén, P. A.Tove, Phys. Rev. 96,773 (1954).

Ti^{44}
22 22
$\geq 23^{y}$

τ $\geq 23^{y*}$ Sc^{45}(30-Mev p,2n) chem
γ 0.16 scin
D 4.0^{h}Sc chem Not D 2.4^{d}Sc

R.A.Sharp, R.M.Diamond, Phys. Rev. 93, 358 (1954); * 96, 1713 (1954).

Ti^{46}
22 24
stable

Level $Ti^{(46)}$($\alpha,\alpha'\gamma$) $E_{\alpha} = 6.0$; scin
γ 0.890 *14* $\tau_{\gamma}(E2) = 1.8 \times 10^{-12}s^{*}$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 99 (1955); BAPS 30, #3 (Washington), CA10(1955); *verbal report.

Ti^{47}
22 25
stable

Level Ti^{47}($\alpha,\alpha'\gamma$) $E_{\alpha} = 1.2$ to 3.4
γ 0.160 $\epsilon B(E2) = 0.047$ scin
Previously reported 0.433 γ not in Ti*

G.M.Temmer, N.P.Heydenburg, Phys. Rev. 96, 426 (1954); 93, 351 (1954); *priv. comm.

Ti^{48}
22 26
stable

Level $Ti^{(48)}$($\alpha,\alpha'\gamma$) $E_{\alpha} = 6.0$; scin
γ 0.990 *15* $\tau_{\gamma}(E2) = 1.5 \times 10^{-12}s^{*}$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 99 (1955); BAPS 30, #3 (Washington), CA10(1955); *verbal report.

Ti^{49}
22 27
stable

Levels $Ti^{(48)}$(d,p) $E_{d} = 2.6$
~0.5* (g.s.) ppl
6* (1.35)
4* (1.70)
~2* (2.41)
*σ in units of 10^{-4} barns
d,p(θ) of groups to 1.40 and 1.74 levels suggest stripping (with coulomb effects) rather than compound nucleus formation

W.W.Pratt, Phys. Rev. 97, 131 (1955).

Ti^{51}
22 29
5.8^{m}

Ti^{50}(pile n,γ)
β^{-} 1.8 a β(0.92 γ)
2.3 a β(0.32 γ)
γ 100† (0.32) scin
1† 0.610 *15*
5† 0.920 *15*
(0.32 γ)(0.61 γ) No (0.32 γ)(0.92 γ)
No β^{-} to g.s. (< 15%) β(0.32 γ)/β

W.C.Jordan, S.B.Burson, J.M.LeBlanc, Phys. Rev. 96, 1582 (1954).

V
23

Resonances V(n) $E_{n} = 2$ to 100 kev

E_o(kev)	E_o(kev)	Li(p,n)
4.1	22.2	
6.6	69.1	J = 4
11.5	87.1	J = 3
16.6		

Other weaker resonances with 22 < E_o < 70

M.Marshak, H.W.Newson, Phys. Rev. 98 (1955); BAPS 30, #1 (New York), HA9, (1955).

V^{46}
23 23
0.4^{s}

τ 0.4^{s} Ti(23-Mev p)
See also Cr^{47} V(57-Mev p)

H.Tyrén, P. A.Tove, Phys. Rev. 96, 773(1954).

V^{47}
23 24
31.1^{m}

τ 31^{m} *1* Ti(13-Mev d)
β^{+} 1.89 *1* F-K plot linear sl
No ce 0.16 γ (< 0.08% of β^{+})
No pe (0.05 to 0.21 Mev)

H.Daniel, Z. Naturf. 9a, 974 (1954).

V^{49}
23 26
334^{d}

τ 327^{d} *20* $Ti^{(48)}$(15-Mev d,n) chem
No 0.080 γ, 0.120 γ, 0.128 γ pc,scin
$E_{\epsilon} = 0.622$ *10* γ continuum
Shape of γ continuum in agreement with theory by Glauber and Martin

R.W.Hayward, D.D.Hoppes, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), V4(1955); verbal report.

τ 334^{d} *20* Cr(22-Mev p) chem
x Ti K x rays pc
No β^{+}(< 0.05%) GM,scin
No γ with $0.51 > E_{\gamma} > 0.03$ (< 0.05%) scin
No ce GM

W.S.Lyon, Phys. Rev. 97, 121 (1955).

V^{50}
23 27
stable

τ $> 3 \times 10^{15y}$ GM,pc
Absence of 1.6 γ, 1.2 β^{-}, 1.4 β^{+}, Ti K x rays gives $\tau > 3 \times 10^{15}y$, $3 \times 10^{14}y$, $10^{15}y$, $3 \times 10^{14}y$ resp.

J.Heintze, Z. Naturf. 10a, 77 (1955).

V^{51}
23 28
stable

γ V^{51}($\alpha,\alpha'\gamma$) $E_{\alpha} = 3.4$
0.320 $\epsilon B(E2) = 0.013$ scin
Large departure from theoretical E2 excitation curve

G.M.Temmer, N.P.Heydenburg, Phys. Rev. 96, 426 (1954).

Cr
[illegible]

γ Cr(n,?γ) $E_{n} = 3.2$ scin
0.03† 0.75
0.10† 0.97
0.73† 1.43
†σ in barns

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

Cr^{46}?
[illegible] 22

τ 1.1^{s} V(57-Mev p)
Cr(165-Mev p)

H.Tyrén, P.A.Tove, Phys. Rev. 96, 773(1954).

Cr^{47}? 24 23

τ 0.4^s V(57-Mev p)
See also V^{46} and Mn^{49} Cr(100-Mev p)

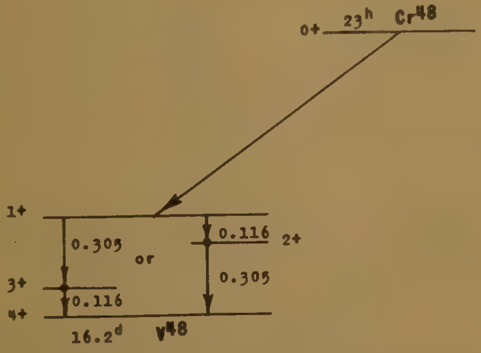
H.Tyrén, P. A.Tove, Phys. Rev. 96, 773(1954).

Cr^{48} 24 24 23^h

τ 24^h *1* Ti^{46}(50-Mev α,2n) chem
γ 100† 0.118 scin
~100† 0.307
(0.118 γ)(0.307 γ) Σscin
No other γ No β^+ (< 2%) D 16.2^dV

J.R.Wilkinson, R.K.Sheline, Phys. Rev. 98, (1955).
BAPS 30, #2 (Baltimore), 69; verbal report.

τ 23^h *1* Ni(380-Mev p) chem
D 16.2^dV
γ 95† 0.116 *4* a~0.02 M1 } sl ce
100† 0.305 *10* a~0.006 E2 } scin
No β^+ (< 2%), no other γ's (< 0.2%)
(0.116 γ)(0.305 γ) scin



R. van Lieshout, D.H.Greenberg, C.S.Wu, Phys. Rev. 98 (1955).
BAPS 30, #1(New York), MA1

Cr^{51} 24 27 27^d

γ 0.325 *5* M1 sl ce,Cp
$a = 1.45 \pm 0.15 \times 10^{-3}$

Z.O'Friel, A.H.Weber, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), V5(1955); verbal report.

Level $Ti^{(48)}$(α,nγ) $E_a = 6.0$
$V^{(51)}$(p,nγ)
γ 0.750 *11* scin

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 99 (1955); BAPS 30, #3 (Washington), CA10(1955);

Mn^{49}? 25 24

τ 0.4^s Cr(100-Mev p)
See also Cr^{47}

H.Tyrén, P. A.Tove, Phys. Rev. 96, 773(1954).

Mn^{50} 25 25 0.3^s

τ 0.26^s Cr(45-Mev p)
0.28 Mn^{55}(95-Mev p)

H.Tyrén, P. A.Tove, Phys. Rev. 96, 773(1954).

Mn^{52} 25 27 5.72^d

τ 5.72^d *2* $Cr^{(52)}$(15-Mev d,2n)
Counted for 104 days chem

E.W.Backofen, R.H.Herber, Phys. Rev. 97, 743 (1955).

$\beta^+/\epsilon = 0.47 \pm 0.05$ $\gamma^{\pm}\gamma^{\pm}/\gamma$ GM

R.Sehr, Z.Phys. 137, 523 (1954).

Mn^{54} 25 29 291^d

τ 291^d *1* $Cr^{(54)}$(15-Mev d,2n)
Counted for 104 days chem

E.W.Backofen, R.H.Herber, Phys. Rev. 97, 743 (1955).

τ 290^d *10* $Cr^{(54)}$(d,2n)
From analysis of decay of 20 samples

P.Kafalas, Thesis, MIT August 1954.

γ (0.835) $Fe^{(56)}$(d,α) chem
Anisotropy up to 90% in $\gamma(\theta,T)$ shows 0.835 γ is not dipole and that angular momentum of $e^- + \nu$ is the minimum for given J_i and J_f

M.A.Grace, C.E.Johnson, N.Kurti, H.R.Lemmer, F.N.H.Robinson, Phil. Mag. 45, 1192 (1954).

γ (0.835) $Fe^{(56)}$(d,α) chem
Polarization as f(θ,T) shows that if quadrupole, 0.835 γ is E2

G.R.Bishop, J.M.Daniels, H.Durand, C.E.Johnson, J.Perez, Phil. Mag. 45,1197 (1954).

Mn^{55} 25 30 stable

q +0.6 MnO_3F Mic
q coupling compared with that for ReO_3Cl

A.Javan, A.Engelbrecht, Phys. Rev. 96, 649 (1954).

Level Mn^{55}(α,α'γ) $E_a = 1.1$ to 3.4
γ 0.128 $\epsilon B(E2) = 0.070$ scin
Mn^{55}(α,α'γ) $E_a = 1.86$
Mn^{55}(p,p'γ) $E_p = 0.75$
γ 0.128 E2 from α yield/p yield

G.M.Temmer, N.P.Heydenburg, Phys. Rev. 96, 426 (1954); 93, 351 (1954).

Level Mn^{55}(n,n'γ) $E_n = 0.2$ to 1.0
γ 0.128 *2* J = 7/2

D.A.Lind, J.J.Van Loef, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), F8(1955); Phys. Rev. 98, 224A (1955).

Mn^{55}
25 30
stable

Level $Mn^{55}(p,p'\gamma)$ $E_p = 3.50$
γ 0.128 sπ·ce

E.M.Bernstein, H.W.Lewis, Phys. Rev. 99(1955); BAPS 30, #3(Washington), CA7 (1955).

Level $Mn^{55}(p,p')$ $E_p = 4.6$ to 5.7 sπ
0.128 *7*

J.P.Schiffer, P.M.Windham, C.R.Gossett, G.C. Phillips, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), TA9 (1955).

γ $Mn^{55}(n,n'\gamma)$ $E_n = 0.7$ to 1.3
st 0.126 *3* scin
20† 0.853 *7**
1† ~0.98
*Graph of σ from threshold (0.98) to 1.3

J.M.Freeman, Phil. Mag. 46, 12 (1955).

γ $Mn^{55}(n,?\gamma)$ $E_n = 3.2$ scin
0.58 1.50
0.67 st 1.86
st 0.83 st 2.2
1.16

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

Mn^{56}
25 31
2.58^h

Resonances $Mn^{55}(n,n'\gamma)$ $E_n = 0.98$ to 1.3
Graph of yield of 0.853 γ scin

J.M.Freeman, Phil. Mag. 46, 12 (1955).

Resonances $Mn^{55}(n)$ $E_n = 2$ to 100 kev
E_o (kev) E_o (kev)
2.4 J = 3 21.2
7.3 27.3
9.0 35.1 J = 3
Other weak resonances present Li(p,n)

H.Marshak, H.W.Newson, Phys. Rev. 98, (1955); BAPS 30, #1 (New York), HA9, (1955).

Fe
26

γ Fe(n,n'γ) $E_n = 2.7$
0.462 1.42 scin
0.634 1.59
0.851 1.76
0.989 2.10
1.24 2.66

D.L.Lafferty, L.A.Rayburn, T.M.Hahn, Phys. Rev. 96, 381 (1954); 95, 301A, 637A(1954).

γ Fe(n,n'γ) $E_n = 3.2$ scin
1.18† 0.84
0.39† 1.17
0.33† 1.67
†σ in barns

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

Fe
26

γ Fe(n,n'γ) $E_n = 4.4$
0.85 2.1 scin
1.20 2.5
1.73 3.0

R.M.Sinclair, Phys. Rev. 98 (1955). BAPS 30, #1, (New York), A2; verbal report.

Fe^{54}
26 28
stable

Level $Fe^{54}(n,n'\gamma)$ $E_n = 4.4$
γ 1.40 *2** scin
No other γ with $E_\gamma < 3.0$

R.M.Sinclair, Phys. Rev. 98(1955). BAPS 30, #1 (New York), A2; *verbal report.

Level $Fe^{54}(p,p')$ $E_p \leq 5.7$ sπ
1.413 *5*

G.C.Phillips, C.R.Gossett, J.P.Schiffer, P.M. Windham, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), TA8 (1955).

Fe^{55}
26 29
2.9^y

Level $Fe^{54}(d,p)$ $E_d = 10$ a
g.s. Q = 7.18 *7*

C.E.McFarland, F.B.Shull, A.J.Elwyn, B.Zeidman, Phys. Rev. 99(1955); BAPS 30, #3(Washington), TA6(1955); priv. comm.

Fe^{56}
26 30
stable

Level $Fe^{(56)}(p,p')$ $E_p = 17$
~40* (0.84)
*σ in mb
Angular distribution and σ suggest applicability of the direct interaction theory [see Phys. Rev. 92,350(1953)]

G.Schrank, P.C.Gugelot, I.E.Dayton, Phys. Rev. 96, 1156 (1954).

Level $Fe^{(56)}(n,n'\gamma)$ $E_n = 0.7$ to 1.3
γ 0.841 *5* scin
Graph of σ from threshold to 1.3

J.M.Freeman, Phil. Mag. 46, 12 (1955).

Level $Fe^{56}(p,p')$ $E_p \leq 5.7$ sπ
0.845 *5*

G.C.Phillips, C.R.Gossett, J.P.Schiffer, P.M. Windham, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), TA8(1955).

Level $Fe^{(56)}(\alpha,\alpha'\gamma)$ $E_\alpha = 6.0$; scin
γ 0.854 *13* $\tau_\gamma(E2) = 2.9 \times 10^{-12s*}$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 99 (1955); BAPS 30, #3(Washington), CA10(1955); *verbal report.

Fe^{56}
26 30
stable

Levels	$Fe^{(56)}(n,n')$		$E_n = 4.4$	
0.04†	0.85	0.01†	2.7	ppl
0.02†	2.05	0.02†	3.1	

†$d\sigma/d\omega$ (90°)

J.B.Weddell, B.Jennings, R.L.Hellens, Phys. Rev. 99(1955); BAPS 30,#3(Washington), F6 (1955); verbal report; Phys. Rev. 95, 636A (1954).

Fe^{57}
26 31
stable

Levels $Fe^{57}(\alpha,\alpha'\gamma)$ $E_\alpha = 3.5$

γ (0.014) scin
0.123*
(0.137) $\epsilon B(E2) = 0.043$

*Excitation function suggests γ emitted from 0.137 level

G.M.Temmer, N.P.Heydenburg, Phys. Rev. 96, 426 (1954); 93, 351 (1954); 95, 629A (1954).

Levels $Fe^{56}(d,p)$ $E_d = 10$ a

	Level	l_n	
6†	g.s.	1	Q = 5.49 *6*
2†	1.24 *6*	1	
1†	1.65 *6*		
10†	2.46 *6*		
3†	3.23 *6*		
3†	4.11 *10*		

Level $Fe^{57}(d,p)$ $E_d = 10$
g.s. $l_n = 1$

C.E.McFarland, F.B.Shull, A.J.Elwyn, B.Zeidman, Phys. Rev. 99(1955); BAPS 30, #3(Washington), TA6(1955); priv. comm.

Resonances $Fe^{(56)}(n,n'\gamma)$ $E_n = 0.7$ to 1.3
Graph of yield of 0.841 γ scin

J.W.Freeman, Phil. Mag. 46, 12 (1955).

Fe^{58}
26 32
stable

Levels $Fe^{57}(d,p)$ $E_d = 10$ a

	Level	l_n	
1†	g.s.	1	Q = 7.89 *7*
8†	0.79 *7*	1	
25†	1.62 *6*	1	
50†	2.67 *7*	1	
50†	4.21 *7*	1	

C.E.McFarland, F.B.Shull, A.J.Elwyn, B.Zeidman, Phys. Rev. 99(1955); BAPS 30, #3(Washington), TA6(1955); priv. comm.

Co^{54}
27 27
0.2^s

τ 0.20^s Fe (23-Mev p)
See also Cu^{57} Ni (50-Mev p)

H.Tyrén, P.A.Tove, Phys. Rev. 96, 773(1954).

Co^{57}
27 30
270^d

β^+	vw (may be impurity)			$\gamma^{\pm}$ GM, scin
ϵ	100%	K x ray		Σscin, scin
γ	~100%*	0.014	α not low*	
	~100%	0.120	$\alpha < 0.1$	

(0.014 γ)(0.120 γ) delay ~10^{-7s}
(0.014 γ) x observed*

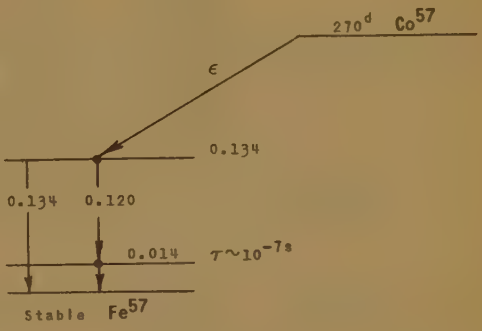
L.Madansky, F.Rasetti, Phys. Rev. 97, 837 (1955); *priv. comm. April (1955).

$Ni^{(58)}$(22-Mev p, 2p) chem

No β^+ ($< 2 \times 10^{-3}$%) sl, scin

γ	1*	0.123 *2*	scin, sl ce
	1*	0.137 *2*	

No other γ's with $0.05 < E_\gamma < 0.6$ scin
*Relative intensities of ce



B.Crasemann, D.L.Manley, Phys. Rev. 98, 66 (1955).

Co^{59}
27 32
stable

γ	$Co^{59}(n,?\gamma)$		$E_n = 3.2$	scin
0.20†	0.60	0.15†	1.7	
0.82†	1.15	0.19†	2.5	
0.53†	1.49			

†σ in barns

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

Co^{60}
27 33
5.2^y

β^- 0.309 *3* sl
F-K plot linear above 0.056

G.Bolla, S.Terrani, L.Zappa, Nuovo Cim. 12, 875 (1954).

$\beta\gamma$ and $\gamma\gamma$ delay $< 10^{-11s}$ scin

Z.Bay, V.P.Henri, F.McLernon, Phys. Rev. 97, 561 (1955); 94, 780A (1954).

No delayed $\beta\gamma$ ($\tau_\gamma < 5 \times 10^{-10s}$)

V.Z.Wintersteiger, Bull. Inst. Nuclear Sci., Boris Kidrich 4, 79 (1954).

Co^{60}
27 33
5.2^{y}

$\gamma\gamma(\theta)$ from paramagnetic crystal source same at 288°K and 20°K

H.R.Lemmer, M.A.Grace, Proc. Phys. Soc. 67A, 1051 (1954).

Levels $Co^{59}(d,p)$ $E_d = 5$ sπ 90°

g.s. Q = 5.283 *8*	
0.060 *3*	2.610 *6*
0.286 *3*	2.624 *6*
0.445 *3*	2.786 *9*
0.513 *3*	2.870 *13*
0.557 *5*	2.924 *9*
0.622 *4*	3.038 *9*
0.792 *3*	3.120 *9*
1.012 *3*	3.138 *9*
1.237 *5*	3.208 *9*
1.394 *4*	3.288 *9*
1.533 *6*	3.304 *9*
1.663 *6*	4.221 *9*
1.825 *6*	4.302 *10*
2.005 *6*	4.421 *10*
2.065 *6*	4.494 *13*
2.154 *6*	4.533 *13*
2.295 *6*	4.571 *13*
2.370 *13*	

G.M.Foglesong, D.G.Foxwell, Phys. Rev. 96, 1001 (1954).

Resonances $Co^{59}(n)$ $E_n = 2$ to 100 kev
Li(p,n)

E_o (kev)
5.4
7.8
28.3

H.Marshak, H.W.Newson, Phys. Rev. 98, (1955); BAPS 30, #1 (New York), HA9.(1955).

Ni
28

γ $Ni(n,?\gamma)$ $E_n = 3.2$ scin

0.05†	0.59	0.54†	1.49
0.84†	1.33	0.01†	2.7

†σ in barns

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

Ni^{54}
28 26
$<5^{m}$

Not observed from Ni(96-Mev p) chem; $\tau < 5^{m}$

R.W.Fink, Thesis, Univ. of Rochester (1953).

Ni^{55}
28 27
$<5^{m}$

Not observed from Ni(96-Mev p) chem; $\tau < 5^{m}$

R.W.Fink, Thesis, Univ. of Rochester (1953).

Ni^{58}
28 30
stable

Level $Ni^{58}(p,p')$ $E_p = 4.6$ to 5.7 sπ
1.453 *5*

J.P.Schiffer, P.M.Windham, C.R.Gossett, G.C. Phillips, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), TA9(1955).

Ni^{59}
28 31
7.5×10^{4y}

Resonances $Ni^{58}(n)$ $E_n = 2$ to 270 kev
Li(p,n)

	E_o (kev)		E_o (kev)
	5	st	162
st	17		192
st	65	st	211
	109		236
	124		No peak at 229 kev*
st	142		

R.C.Block, H.W.Newson, Phys. Rev. 98 (1955); BAPS 30, #1 (New York), HA10, (1955);
*priv. comm.

Ni^{60}
28 32
stable

Level $Ni^{60}(p,p')$ $E_p = 4.6$ to 5.7 sπ
1.329 *5*

J.P.Schiffer, P.M.Windham, C.R.Gossett, G.C. Phillips, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), TA9(1955).

Ni^{61}
28 33
stable

Resonances $Ni^{60}(n)$ $E_n = 2$ to 270 kev
Li(p,n)

	E_o (kev)		E_o (kev)
st	15		140
st	30		162
st	67	st	188
	88	st	200
	99		257
	109		

R.C.Block, H.W.Newson, Phys. Rev. 98 (1955); BAPS 30, #1 (New York), HA10 (1955).

Ni^{66}
28 38
56^{h}

β^- 0.3 Ta^{181}(340-Mev p) a

W.E.Nervik, G.T.Seaborg, Phys. Rev. 97, 1092 (1955).

Cu
29

γ $Cu(n,?\gamma)$ $E_n = 3.2$ scin

0.21†	0.66	0.81†	1.37
0.12†	0.96	0.16†	1.9

†σ in barns

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

Cu^{57}?
29 28

τ 0.18^{s} Ni(50-Mev p)
See also Co^{54}

H.Tyrén, P.A.Tove, Phys. Rev. 96, 773(1954).

Cu^{58}
29 29
3.0^{s}

τ 3^{s} Ni(23-Mev p)

H.Tyrén, P.A.Tove, Phys. Rev. 96, 773 (1954).

Cu^{62}
29 33
10^{m}

No γ $Cu^{(63)}$($<$23-Mev γ,n)
$\gamma(0.1 \leq E_\gamma \leq 1.2) < 0.3\%$ of $\gamma^\pm$ scin
No$(0.56\ \gamma)\gamma^\pm$ Σscin
No γ with $E_\gamma > 1.2$ scin

J.M.Reid, I.F.Wright, Nature 175, 298 (1955).

Cu^{63} q -0.16 *3* para
29 34
stable

B.Bleaney, K.D.Bowers, M.H.L.Pryce, Proc. Roy. Soc. 228A, 166 (1955).

Levels $Cu^{63}(p,p')$ $E_p = 4.6$ to 5.7 $s\pi$
0.669 *5* 1.410 *5*
0.968 *5* 1.549 *5*
1.326 *5*

J.P.Schiffer, P.M.Windham, C.R.Gossett, G.C. Phillips, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), TA9(1955).

$Cu^{(63)}(\gamma,n)$ $E_\gamma = 17.55$ to 17.67
Structure in giant resonance observed from yield of 10^mCu

D.P.Bunbury, Proc. Phys. Soc. 67A, 1106(1954).

Cu^{65} q -0.15 *3* para
29 36
stable

B.Bleaney, K.D.Bowers, M.H.L.Pryce, Proc. Roy. Soc. 228A, 166 (1955).

$Cu^{65}(p,p')$ $E_p = 4.6$ to 5.7 $s\pi$
No levels observed below 1.5

J.P.Schiffer, P.M.Windham, C.R.Gossett, G.C. Phillips, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), TA9(1955).

Zn γ $Zn(n,?\gamma)$ $E_n = 3.2$ scin
30
1.3† 1.02
0.03† 1.3
0.02† 1.6
†σ in barns

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

Zn^{64} $Zn^{(64)}(\gamma,n)$ $E_\gamma = 17.55$ to 17.67
30 34
stable
Possible structure in giant resonance from yield of 38^mZn

D.P.Bunbury, Proc. Phys. Soc. 67A,1106(1954).

Zn^{67} $Zn^{67}(\alpha,\alpha'\gamma)$ $E_\alpha = 3.5$
30 37
stable
γ 0.092* (2 unresolved γ's) scin
0.182 $\epsilon B(E2) = 0.043$
*Excitation function shows γ's emitted from 0.182 level

G.M.Temmer, N.P.Heydenburg, Phys. Rev. 96, 426 (1954); 93, 351 (1954).

Zn^{69} γ 0.435 $\alpha = 0.053$ M4 sl
30 39
14^h

A.B.Smith, Dissertation Abstr. 13,849(1953).

Zn^{69} γ 0.435 $Zn^{(68)}(th\ n,\gamma)$
30 39
14^h
No other γ No $\beta\gamma$ scin

J.M.LeBlanc, J.M.Cork, S.B.Burson, Phys. Rev. 97, 750 (1955).

Zn^{69} β^- 100% 0.914 d 14^hZn; sl
30 39
51^m

A.B.Smith, Dissertation Abstr. 13,849(1953).

β^- 0.85 $Zn^{(68)}(th\ n,\gamma)$ a
No γ scin

J.M.LeBlanc, J.M.Cork, S.B.Burson, Phys. Rev. 97, 750 (1955).

Levels $Zn^{68}(d,p)$ $E_d = 11.9$ scin
100† g.s. Q=4.16 *15* $l_n = 1$ d,p(θ)
40† (0.435) $l_n = 4$
125† 0.77 $l_n = 2?$
1.6
†Relative numbers at forward peaks

F.S.Eby, Phys. Rev. 96, 1355 (1954); 93, 925A (1954).

Zn^{71} τ_1 3^h $Zn^{70}(pile\ n,\gamma)$
30 41
3^h
β^- 1.5 *1* a$\beta\gamma$
γ 0.38 scin $\beta\gamma$
0.49* scin $\beta\gamma$
0.61 scin $\beta\gamma$
*Not same as 0.51γ of 2.2^mZn ($\Delta E_\gamma = 0.03$)
(1.5β)(0.38γ, 0.49γ, 0.61γ)
All three γ's in cascade scin $\gamma\gamma$

J.M.LeBlanc, J.M.Cork, S.B.Burson, Phys. Rev. 97, 750 (1954); 94, 1436A (1954).

Zn^{71} τ_2 2.2^m $Zn^{70}(pile\ n,\gamma)$
30 41
2.2^m
β^- 2.4 *2* a$\beta\gamma$,a
γ 0.12 scin
0.51*
w 0.90
w 1.09
*Not same as 0.49γ of 3^hZn ($\Delta E_\gamma = 0.03$)
(2.4β)(0.51γ) β(0.12, 0.51, 0.90, 1.09γ)
No (0.12γ)(0.51γ)

J.M.LeBlanc, J.M.Cork, S.B.Burson, Phys. Rev. 97, 750 (1954); 94, 1436A (1954).

Ga^{69} μ_3 0.11 *2* M
31 38
stable
Interaction constant = 84 ± 6 cps

R.T.Daly, Jr., J.H.Holloway, Phys. Rev. 96, 539 (1954).

Ga^{71}
31 40
stable

μ_3 0.15 *2* M
Interaction constant = 115 ± 7 cps

R.T.Daly, Jr., J.H.Holloway, Phys. Rev. 96, 539 (1954).

Ge
32

γ $Ge(n,n'\gamma)$ $E_n = 4.4$

	E_γ	A	
47+	0.51*	?	scin
100+	0.61	74	
66+	0.84	72	
42+	1.05	70	
~9+	1.25	74?	

*$\tau < 0.3^s$

R.M.Sinclair, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), F7(1955); verbal report.

Ge^{70}
32 38
stable

Level $Ge^{70}(\alpha,\alpha'\gamma)$ $E_\alpha = 6.5$; scin
γ 1.020 *15* $\tau_\gamma(E2) = 1.4 \times 10^{-12s}$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 99 (1955); BAPS 30, #3 (Washington), CA10(1955); verbal report.

Level $Ge^{(70)}(n,n'\gamma)$ $E_n = 4.4$
γ 1.05 scin

R.M.Sinclair, Phys. Rev. 99(1955); BAPS 30, #3(Washington), F7(1955); verbal report.

Ge^{71}
32 39
11.4^d

$e_A(L)/e_A(K) = 1.26$ DC
$\epsilon_L/\epsilon_K = 0.30$, 0.22 or (0.11 theory) for
fluorescence yield 0.45^*, 0.49^{**} or 0.54 resp.

M.Langevin, Compt. rend. 239, 1625 (1954); *Burhop, The Auger Effect, Camb. Univ. Press p. 48 (1952); **Broyles, Thomas, Haynes, Phys. Rev. 89, 723 (1953).

Ge^{72}
32 40
stable

Level $Ge^{(72)}(n,n'\gamma)$ $E_n = 4.4$
γ 0.84 scin

R.M.Sinclair, Phys. Rev. 99(1955); BAPS 30, #3(Washington), F7(1955); verbal report.

Level $Ge^{72}(\alpha,\alpha'\gamma)$ $E_\alpha = 6.0$; scin
γ 0.830 *13* $\tau_\gamma(E2) = 1.3 \times 10^{-12s*}$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 99 (1955); BAPS 30, #3(Washington), CA10(1955); *verbal report.

Ge^{73}
32 41
stable

Level $Ge^{73}(\alpha,\alpha'\gamma)$ $E_\alpha = 3.5$
γ 0.068 $\epsilon B(E2) = 0.042$ scin
No 0.014 γ or 0.054 γ observed

G.M.Temmer, N.P.Heydenburg, Phys. Rev. 96, 426 (1954); 93, 351 (1954); 95, 629A (1954).

Ge^{74}
32 42
stable

Level $Ge^{74}(\alpha,\alpha'\gamma)$ $E_\alpha = 6.0$; scin
γ 0.593 *9* $\tau_\gamma(E2) = 9.0 \times 10^{-12s*}$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 99 (1955); BAPS 30, #3 (Washington), CA10(1955); *verbal report.

Level $Ge^{(74)}(\gamma,\gamma)$ As^{74} vapor
γ (0.596) $J = 2$ $\gamma\gamma(\theta)$
$\tau = 1.7 \times 10^{-11s}$ σ

F.R.Metzger, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), BA8(1955).

Level $Ge^{(74)}(n,n'\gamma)$ $E_n = 4.4$
γ 100+ 0.61 scin
~9+ 1.25*
*Assigned from systematics (Phys. Rev. 98, 214)

R.M.Sinclair, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), F7(1955); verbal report.

Ge^{75}
32 43
49^s

τ 49^s *2* Ge^{74}(pile n,γ)
γ 0.1385 *10* $K/LM > 8$ π ce, scin

S.B.Burson, W.C.Jordan, J.M.LeBlanc, Phys. Rev. 96, 1555 (1954); 95, 613A (1954).

Ge^{76}
32 44
stable

Level $Ge^{76}(\alpha,\alpha'\gamma)$ $E_\alpha = 6.0$; scin
γ 0.566 *9* $\tau_\gamma(E2) = 1.1 \times 10^{-11s}$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 99 (1955); BAPS 30, #3 (Washington), CA10(1955); verbal report.

Ge^{77}
32 45
52^s

τ_1 52^s *2* Ge^{76}(pile n,γ)
β^- 10* ~2.7 a $\beta\gamma$
90* (2.9)
scin
γ 100† 0.159 *3*
100† 0.215 *3*
(~2.7 β) (0.215 γ) No β (0.159 γ)
No (0.159 γ) (0.215 γ) *2.7 β/2.9 β = 1/9

S.B.Burson, W.C.Jordan, J.M.LeBlanc, Phys. Rev. 96, 1555 (1954); 95, 613A (1954).

Ge^{77}
32 45
12^h

β^- ~1.3 Ge^{76}(pile n,γ) a $\beta\gamma$
~1.5 a $\beta\gamma$
2.1 a $\beta\gamma$
γ 0.210 *1* 0.91 *2* scin
0.215 *3* 1.09 *2*
0.265 *1* 1.19 *2*
0.365 *7* 1.36 *3*
0.410 *8* (1.46)*
0.560 *10* (1.54)*
0.625 *15* 1.75 *3*
0.710 *15* 2.00 *5*
0.79 *8* 2.30 *5*
*Unresolved

(CONTINUED)

Ge^{77}
32 45
12^h

$\gamma_a \backslash \gamma_b$	~0.21	0.265	0.365	0.410	0.560	0.625
0.210		Y				
0.215				Y		
0.265	Y		Y		Y	
0.365		Y			Y	
0.410	Y	N	N		Y	
0.560	Y	Y	Y	Y		
0.625					Y	
0.79		Y	Y	Y	Y	Y
0.91	Y	Y	Y	Y	N	Y ?
1.19	N	Y	N		N	N
1.36		Y	Y	Y	N	Y
1.75						Y

Coincidences observed (Y) and not observed (N) between γ_b and indicated γ_a

No 0.300 γ, 0.327 γ, 0.428 γ, 0.466 γ
No 2.75 γ (Na^{24} impurity)
(~1.3 β) (1.09 γ) (~1.5 β) (0.56 γ)
(2.1 β) (~0.21 γ, 0.265 γ, 0.365 γ, 0.410 γ)
(1.09 γ) γ delay $> 1.6^{\mu s}$

S.B.Burson, W.C.Jordan, J.M.LeBlanc, Phys. Rev. 96, 1555 (1954); 95, 613A (1954).

$As^{?}$
33

τ 27^m Se(fast n) chem
Possibly Se but not Ge activity

C.Ythier, G.Herrmann, Z. Elektrochem 58, 630 (1954).

$As^{68?}$
33 35

τ $\sim 7^m$ $Ge^{(70)}$($\geq$40-Mev p, 3n) chem

F.D.S.Butement, E.G.Prout, Phil. Mag. 46, 357 (1955).

As^{69}
33 36
15^m

τ 15^m $Ge^{(70)}$($\geq$20-Mev p, 2n) chem
β^+ 2.9 a
No other β^+
γ 0.23 scin
No other γ p 40^hGe chem

F.D.S.Butement, E.G.Prout, Phil. Mag. 46, 357 (1955).

As^{70}
33 37
52^m

γ 0.18 $Ge^{(70)}$(8-Mev p, n) chem
1.06 1.74 scin
1.36 2.04

F.D.S.Butement, E.G.Prout, Phil. Mag. 46, 357 (1955).

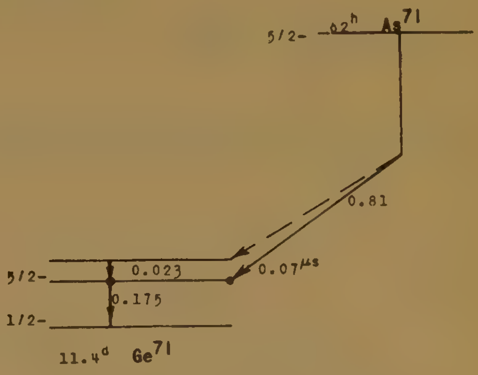
As^{71}
33 38
62^h

τ 65^h *5*
$Ge^{(70)}$(25-Mev d, n) chem; ms
β^+ 3† 0.25 ? sl
97† 0.813 *10*
15* 0.0233 *3* K/LM = 5.4 sl ce
21* 0.1745 *4* K/LM = 8.9 3d ce
vw 0.535 *40* ? scin
$\epsilon_K/\beta^+ = 2.1 \pm 1.0$ from $e_A/\beta^+ = 1.5$
(0.813 β)(0.175 γ) sl
(ce_K 0.023 γ)(0.175 γ) sl
*ce per 100 β^+

S.Thulin, J.Moreau, H.Atterling, Arkiv Fysik 8, 219 (1954).

As^{71}
33 38
62^h

τ 62^h *3* Ge^{70}(11-Mev d, n) chem
β^+ 0.815 *10* sl
γ ~2.3* 0.02300 *5* K/LM ~1 sl ce
23* 0.1750 *3* K : L : M = 31 : 4 : 1
$a_K = 0.095$ E2
$\gamma^{\pm}$(0.175 γ) delay = $0.07^{\mu s}$
*ce per 100 β^+



W.E.Graves, A.C.G.Mitchell, Phys. Rev. 97, 1033 (1955).

As^{79}
33 46
9^m

τ 9.1^m Se(fast n) chem
p 3.9^mSe chem

C.Ythier, G.Herrmann, Z. Elektrochem. 58, 630 (1954).

$As^{80?}$
33 47

τ $\sim 36^s$ $Se^{(80)}$(fast n, p) chem

C.Ythier, G.Herrmann, Z. Elektrochem. 58, 630 (1954).

Se^{73}
34 39
7.1^h

$Ge^{(70)}$(30-Mev α, n) chem
β^+ 100†* 1.29 *1*
$\leq$1†* 1.65 *1* sl
γ 29.8** 0.0659 *2* K/LM = 10.2 M1 sl ce
$\tau < 5 \times 10^{-9 s}$ $\gamma\gamma$
1.4** 0.359 *1* $\tau = 6.0 \times 10^{-6 s}$ M2 $\gamma^{\pm}\gamma$
No 0.86 γ, 1.31 γ (< 1%) scin
(0.359 γ)(0.066 γ) $\gamma^{\pm}$(0.066 γ, 0.359 γ)
*$6^{\mu s}$ delay for $\geq$ 99% of $\gamma^{\pm}$ (0.066 γ)
**ce per 100 β^+

R.W.Hayward, D.D.Hoppes, Phys. Rev. 98 (1955). BAPS 30, #1 (New York), MA2; verbal report.

Se^{75}
34 41
127^d

Highest energy sum peak at 0.405 is strongest
(0.138 γ)(0.269 γ) No (0.098 γ)γ Σ scin
No (0.077 γ)(0.269 γ) Possible (0.124 γ)γ

D.C.Lu, W.H.Kelly, M.L.Wiedenbeck, Phys. Rev. 97, 139 (1955).

Se^{79}
34 45
3.9^m

τ_1 3.91^m *5* $Br^{(79)}$(fast n, p) chem

C.Ythier, G.Herrmann, Z. Elektrochem. 58, 630 (1954).

Se^{81} τ_1 56.8^m *2* Br$^{(81)}$(fast n,p) chem

34 47

57^m

C.Ythier, G.Herrmann, Z. Elektrochem. 58, 630 (1954).

γ ~0.100 K/L = 4.0 ± 0.2 s ce

α_K = 8.6 ± 2.4 E3?

G.M.Drabkin, L.I.Rusinov, Doklady Akad. Nauk SSSR 97, 417 (1954).

Se^{81} τ_2 18.2^m *2* d 57^{m}Se chem

34 47

18^m

C.Ythier, G.Herrmann, Z. Elektrochem. 58, 630 (1954).

Rb^{81} J 3/2 M

37 44

4.7^h μ 2.00 *6*

J.F.Hobson, J.C.Hubbs, W.A.Nierenberg, H.B.Silsbee, Phys. Rev. 96, 1450 (1954); Phys. Rev. 99(1955); BAPS 30, #3 (Washington), BA4 (1955).

Rb^{85} q +0.31 M

37 48

stable

B.Senitzky, I.I.Rabi, M.L.Perl, Phys. Rev. 98 (1955).
BAPS 30, #2 (Baltimore), G2.

q +0.29 *2* M

H.Kruger, U.Meyer-Berkhout, Naturwiss. 42, 94 (1955).

Rb^{86} J 2 M

37 49

19.5^d μ -1.69 *1*

E.H.Bellamy, K.F.Smith, Phil. Mag. 44, 33 (1953); Nature 168, 556(1951).

β^- 0.715 *10* sl $\beta\gamma$

1.798 ΔJ = 2, yes shape sl

R.S.Caird, A.C.G.Mitchell, Phys. Rev. 94, 412 (1954).

Levels Rb^{85}(d,p) E_d = 15.1

g.s. ? Q = 6.2 *3* scin

1.5 ?

M.S.Wall, Phys. Rev. 96, 664 (1954).

Rb^{87} τ 4.3 x 10^{10y} GM

37 50 Corrections for backscattering and absorption

6.2x10^{10y}

I.Geese-Bähnisch, E.Huster, Naturwiss. 41, 495 (1954).

Rb^{87} q +0.14 *1* M

37 50

6.2x10^{10y}

H.Kruger, U.Meyer-Berkhout, Naturwiss. 42, 94 (1955).

q(Rb^{85})/q(Rb^{87}) = 2.0669 *5* M

Implies q = +0.15. See Rb^{85}, Senitzky et al.

J.W.Trischka, R.Braunstein, Phys. Rev. 96, 968 (1954).

Sr Resonance Sr(n,γ) E_n = 0.025 to 500 ev

38

3.58 ev $\sigma_0\Gamma^2$ = 5.6 to 8.4

mod cyc

E.Meservey, Phys. Rev. 96, 1006 (1954); 86, 605A (1952).

Sr^{87} γ (0.388) α = 0.28 ic

38 49 Authors conclude γ is E5 d 80^{h}Y

2.8^h

I.A.Antonova, I.V.Estulin, Izvest. Akad. Nauk Ser. Fiz. SSSR 18, 79 (1954).

Sr^{88} Resonance Sr^{87}(n) chopper

38 50

stable

E_0(ev)	Γ_n(10^{-3}ev)	Γ_γ(10^{-3}ev)
3.56	0.60	205

A.Stolovy, J.A.Harvey, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), B9(1955); priv. comm.

Sr$^{89?}$ τ_1 ~10^d Sr^{88}(slow n,γ) chem

38 51

γ a

Analysis of decay curve suggests 10^d p of 50^{d}Sr

G.Herrmann, Z.Elektrochem. 58, 626 (1954).
G.Herrmann, F.Strassmann, Z.Naturf. 10a,146 (1955).

Sr^{89} τ 50.4^d *2* Sr^{88}(slow n,γ) chem

38 51

50^d

G.Herrmann, Z. Elektrochem. 58, 626 (1954).
G.Herrmann, F.Strassmann, Z.Naturf. 10a,146 (1955).

Levels Sr$^{(88)}$(d,p) E_d = 15.1

g.s. Q = 4.29 *15* scin

1.09

M.S.Wall, Phys. Rev. 96, 664 (1954).

Sr^{91} τ 9.7^h *1* U(pile n,f) chem

38 53

9.7^h β^- 50% 0.8 a

25% 1.4

25% 2.7

p 50^{m}Y chem; p 57^{d}Y chem

G.Herrmann, Z.Elektrochem. 58, 626 (1954).
G.Herrmann, F.Strassmann, Z.Naturf. 10a, 146 (1955).

Y^{90}
39 51
64.2^h

τ 64.24^h *30* d 28^ySr chem; GM

H.L.Volchok, J.L.Kulp, Phys. Rev. 97, 102 (1955).

τ 64.2^h *2* d 28^ySr chem; GM

P.Schmeling, Z. Naturf. 10a, 79 (1955).

No nuclear γ ($<10^{-4}$%) scin

B.Saraf, J.Varma, C.E.Mandeville, Phys. Rev. 98 (1955).
BAPS 30, #1(New York) SP1; priv. comm.

Levels Y^{89}(d,p) $E_d = 15.1$ scin
g.s. $l_n = 2$ Q = 4.41 *5*
1.17* $l_n = 0$ d,p(θ)
*Possibly two unresolved levels

N.S.Wall, Phys. Rev. 96, 664, 670 (1954).

Zr
40

γ Zr(n,?γ) $E_n = 3.2$ scin

0.038†	0.69	0.14†	1.5
0.40†	0.89	0.44†	2.2
0.12†	1.14		

†σ in barns

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

Levels Zr(n,n') $E_n = 4.4$ ppl
~0.009+ 2.2
~0.008+ 2.8 ?
No 0.93 level
+$d\sigma/d\omega$(90°)

J.B.Weddell, B.Jennings, R.L.Mellens, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), F6 (1955).

Zr^{90}
40 50
0.83^s

τ_1 0.83^s *3* Zr^{90}(fast n,n')
γ 2.30 *2* E5 scin
Graph of σ from threshold (2.3) to 4.4 shows higher levels feed this metastable state.
Comparison with Hauser-Feshbach theory gives best fit for L = 5⁻*
Not d 15^hNb*

E.C.Campbell, R.W.Peelle, F.C.Malenschein, P.H.Stelson, Phys. Rev. 98 (1955).
BAPS,30, #1(New York), MA3; *verbal report.

Zr^{91}
40 51
stable

Resonances Zr^{90}(n) E_n = 5 to 140 kev Li(p,n)

E_o (kev)	Γ(kev)
18	0.12
42	0.40

P.F.Nichols, R.G.Smith, H.W.Newson, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), F2(1955);

Zr^{92}
40 52
stable

Resonance Zr^{91}(n) chopper

E_o(ev)
296

A.Stolovy, J.A.Harvey, Phys. Rev. 99(1955); BAPS 30, #3(Washington), 89(1955); priv. comm.

Zr^{93}
40 53
9.5×10^{5y}

Resonances Zr^{92}(n) E_n = 5 to 140 kev Li(p,n)

E_o (kev)	Γ(kev)
7	0.05
48	0.35

P.F.Nichols, R.G.Smith, H.W.Newson, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), F2(1955).

Zr^{95}
40 55
65^d

Levels Zr^{94}(d,p) $E_d = 15.1$ scin
g.s. Q = 4.19 *5*
0.9 *2*

N.S.Wall, Phys. Rev. 96, 664 (1954).

Resonances Zr^{94}(n) E_n = 5 to 140 kev Li(p,n)

E_o (kev)	Γ(kev)
20	0.11
44	0.20
68	0.50

P.F.Nichols, R.G.Smith, H.W.Newson, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), F2(1955).

Zr^{97}
40 57
17.0^h

γ 2% 1.6 Zr^{96}(pile n,γ) scin

B.Saraf, J.Varma, C.E.Mandeville, Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), SP1; priv. comm.

Nb
41

Abundances ms

Nb^{93}	100%
All others	$<2 \times 10^{-4}$%

F.A.White, T.L.Collins, R.M.Rourke, Phys. Rev. 98 (1955).
BAPS 30, #1(New York), N4.

Nb^{89}
41 48
$\sim 2^h$

τ_1 $\sim 2^h$ $Zr^{(90)}$(40-Mev p,2n)
p 4.3^mZr chem Y^{89}(60-Mev α,4n) chem

H.B.Mathur, E.K.Hyde, C.A.Levine, P.K.Kofstad, Phys. Rev. 97, 117 (1955).

Nb^{89}
41 48
1.9^h

τ_2 1.9^h $Zr^{(90)}$(40-Mev p,2n)
Y^{89}(60-Mev α,4n) chem
β^+ 2.85 *10* scin
No γ scin
p 79^hZr chem

H.B.Mathur, E.K.Hyde, C.A.Levine, P.K.Kofstad Phys. Rev. 97, 117 (1955).

Nb^{90}
41 49
14.6^h

τ 14.60^h *6* Zr(26-Mev d) chem

β^+ scin,sd

β^+	4.5†	0.55
	8.5†	0.865
	87†	1.500 *5*

			K/L	α_K	
γ	vw†	0.133	3.6±0.4	large	E3,M2
	135†	0.142	5.8±0.6	0.32	E2
	3.5†	0.372	6.5±1.0	0.009	E2
	130†	1.130		0.00025	E2
	40†	1.27		<0.0005	
	20†?	1.767			
	120†	2.201		0.00006	E1

$(1.5\beta)(ce_K\ 0.142\gamma)$ $\gamma^{\pm}(0.142\gamma,\ 1.13\gamma)$

No$(1.5\beta)(ce_K\ 0.133\gamma)$ †Relative to 100 β^+

Ong Ping Hok, P.Kramer, G.Meijer, Physica 20, 1200(1954).

Nb^{91}
41 50
62^d

γ 0.1043 K/L = 2.0 ± 0.1 sd ce

Ong Ping Hok, P.Kramer, G.Meijer, Physica 20, 1200 (1954).

Nb^{93}
41 52
stable

γ $Nb^{93}(n,?\gamma)$ $E_n = 3.2$ scin

0.27 0.69

0.53 0.91

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

Nb^{95}
41 54
90^h

γ 0.236 K/L = 3.7 ± 0.1 sd ce

Ong Ping Hok, P.Kramer, G.Meijer, Physica 20, 1200(1954).

Nb^{97}
41 56
60^s

γ 0.75 d 17^hZr scin

B.Saraf, J.Varma, C.E.Mandeville, Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), SP1, priv. comm.

Nb^{97}
41 56
74^m

γ 0.67 d 60^sNb scin

B.Saraf, J.Varma, C.E.Mandeville, Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), SP1; priv. comm.

Mo
42

γ Mo$(n,?\gamma)$ $E_n = 3.2$ scin

0.66† 0.73

0.33† 1.4

0.06† 2.5

†σ in barns

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

Mo^{91}
42 49
66^s

τ_1 66^s *3* $Mo^{(92)}(<14\text{-Mev}\ \gamma,n)$

β^+ ~30% scin

γ ~70% 0.650 *15* M4

w 1.22 *3*

w 1.55 *3*

Threshold (66^s) - threshold(15.5^m) = -30 ± 60 kev

P.Axel, J.D.Fox, R.H.Parler, Phys. Rev. 97, 975 (1955).

Mo^{91}
42 49
15.5^m

τ_2 15.7^m *3* $Mo^{(92)}(\leq 14\text{-Mev}\ \gamma,n)$

β^+ scin

No γ

P.Axel, J.D.Fox, R.H.Parker, Phys. Rev. 97, 975 (1955).

Mo^{93}
42 51
$>2^y$

Levels $Mo^{92}(d,p)$ $E_d = 15.1$

g.s. Q = 5.63 *5* scin

0.91 *10*

1.41 *10*

2.23 *10*

2.73 *10*

N.S.Wall, Phys. Rev. 96, 664 (1954).

Mo^{94}
42 52
stable

Level $Mo^{94}(\alpha,\alpha'\gamma)$ $E_\alpha = 6.5$ scin

γ 0.87 *13* $\tau_\gamma(E2) = 0.9 \times 10^{-12s}$

N.P.Heydenburg, G.M.Temmer, Phys. Revv 99(1955) (1955); BAPS 30, #3 (Washington), CA10(1955); verbal report.

Mo^{95}
42 53
stable

Level $Mo^{(95)}(p,p'\gamma)$ $E_p = 2.46$

γ 0.199 $\epsilon B(E2) = 0.057^*$ scin

G.Paulissen, H.Mark, Phys. Rev. 99(1955);BAPS 30, #3 (Washington), CA6 (1955); *verbal report.

Level $Mo^{95}(\alpha,\alpha'\gamma)$ $E_\alpha = 6.0$ scin

γ 0.204 *4* $\tau_\gamma(E2) = 3.2 \times 10^{-9s}$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 99(19 (1955); BAPS 30, #3 (Washington), CA10 (1955); verbal report.

Mo^{96}
42 54
stable

Level $Mo^{96}(\alpha,\alpha'\gamma)$ $E_\alpha = 6.5$; scin

γ 0.778 *11* $\tau_\gamma(E2) = 1.7 \times 10^{-12s}$

N.P.Heydenburg, G.M.Temmer, Phys. Revà 99 (1955); BAPS 30, #3 (Washington), CA10(1955); verbal report.

Mo^{98}
42 56
stable

Levels $Mo^{97}(d,p)$ $E_d = 15.1$

g.s. Q = 6.06 *10* scin

2.5 *3*

N.S.Wall, Phys. Rev. 96, 664 (1954).

Mo^{98}
42 56
stable

Level $\mathrm{Mo}^{98}(\alpha,\alpha'\gamma)$ $E_\alpha = 6.5$; scin
γ 0.786 *11* $\tau_\gamma(E2) = 1.8 \times 10^{-12s*}$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 99 (1955); BAPS 30, #3(Washington), CA10(1955);
*verbal report.

Mo^{99}
42 57
68^h

β^- 0.41 sl $\beta\gamma$, sl
0.80
1.18
γ 35* (0.040) $\alpha\sim 30$ E2 $\gamma\gamma/\gamma$
65* (0.18) $\alpha\sim 0.6$ M1
0.39 *2* $\beta\gamma$
$(0.41\beta)(0.74+0.78\gamma)$ $(E_\beta \simeq 0.56)(0.39\gamma)$
$(0.80\beta)(0.39\gamma)/\beta = 0.03$
*Relative numbers of photons plus ce

C.Levi, L.Papineau, Compt. rend. 239, 1782 (1954).

$(0.740\gamma)(0.181\gamma)(\theta)$ J = 1/2, 5/2, 9/2 scin
$\mathrm{Mo}^{(98)}$(pile n,γ)

U.Cappeller, R.Klingelhöfer, Z. Phys. 139, 402 (1954).

Mo^{100}
42 58
stable

Level $\mathrm{Mo}^{100}(\alpha,\alpha'\gamma)$ $E_\alpha = 6.0$; scin
γ 0.528 *8* $\tau_\gamma(E2) = 8.4 \times 10^{-12s*}$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 99 (1955); BAPS 30, #3 (Washington), CA10(1955);
*verbal report.

Tc^{98}
43 55

Indications for natural Tc^{98} from:
1. 6^h period produced by Re ores (pile n)
2. Abnormal abundance of Ru^{98} in Mo ores

W.Herr, Z. Naturf. 9a, 907 (1954).

Ru^{100}
44 56
stable

Level $\mathrm{Ru}^{(100)}(\alpha,\alpha'\gamma)$ $E_\alpha = 6.0$ scin
γ 0.540 *8* $\tau_\gamma(E2) = 1.6 \times 10^{-11s*}$

G.M.Temmer, N.P.Heydenburg, Phys. Rev. 99 (1955); BAPS 30, #3(Washington), CA9(1955);
*verbal repott.

Ru^{102}
44 58
stable

Level $\mathrm{Ru}^{(102)}(\alpha,\alpha'\gamma)$ $E_\alpha = 6.0$ scin
γ 0.473 *7* $\tau_\gamma(E2) = 1.6 \times 10^{-11s*}$

G.M.Temmer, N.P.Heydenburg, Phys. Rev. 99 (1955); BAPS 30, #3 (Washington), CA9(1955);
*verbal report.

Ru^{103}
44 59
40^d

$\mathrm{Ru}^{(102)}$(pile n,γ) chem
β^- 7%* 0.11 *1* 0.1%* (0.670) scin
(90%) (0.220) 3%* (0.715) $\beta\gamma$
γ 6† 0.055 *3* $\alpha_K = 1.2 \pm 0.3$ M1 scin
6† 0.440 *10* 6† 0.555 *10* $\gamma\gamma$
1000† 0.495 *5* 70† 0.610 *5*
$(0.220\beta)(0.495\gamma)$ $(0.110\beta)(0.610\gamma)$ scin
No (hard β)(0.055γ) $(0.055\gamma)(0.44\gamma, 0.55\gamma)$
No 0.300γ, 0.365γ (< 1†)
Decay scheme proposed
*Calculated from corresponding γ intensities

B.Saraf, Phys. Rev. 97, 715 (1955); J. Franklin Inst. 258, 517A (1954).

Ru^{103}
44 59
40^d

Ru(28-Mev d) chem
β^- 7% 0.14 *4* $a\beta\gamma$
89% (0.217)
~0.3%* (0.398)
~0.4%* (0.460)
3.0%** (0.702)
γ 4† 0.058 *5* scin
~4† (0.295)
~3† (0.357)
1000† 0.498 K/LM = 8 ± 2 scin, sl ce
78† (0.611) $\alpha_K = 6 \pm 2 \times 10^{-4**}$ E1
91† Rh K x ray
$(0.14\beta)(0.611\gamma)$ No $(0.70\beta)(0.058\gamma)$ scin
*Calculated from corresponding γ intensities
**Based on α_K $(0.498\gamma) = 0.01$
Decay scheme proposed

B.De Raad, W.C.Middelkoop, B. Van Nooyen, P.M.Endt, Physica 20, 1278 (1954).

Ru^{104}
44 60
stable

Level $\mathrm{Ru}^{(104)}(\alpha,\alpha'\gamma)$ $E_\alpha = 6.0$ scin
γ 0.355 *6* $\tau_\gamma(E2) = 6 \times 10^{-11s*}$

G.M.Temmer, N.P.Heydenburg, Phys. Rev. 99 (1955); BAPS 30, #3(Washington), CA9(1955);
*verbal report.

Ru^{107}
44 63
4^m

β^- ~4 $\mathrm{Pd}^{(110)}$(fast n,α) chem
High energy γ's U(28-Mev d, f), U(n, f) chem
p 24^mRh

G.B.Baró, P.Rey, W.Seelmann-Eggebert, Z.Naturf. 10a, 81 (1955).

$\mathrm{Ru}^{108?}$
44 64

τ $\sim 4^m$ U(28-Mev d, f) chem
p 18^sRh chem Mass assignment uncertain

G.B.Baró, P.Rey, W.Seelmann-Eggebert, Z.Naturf. 10a, 81 (1955).

Rh^{96}
45 51
$\sim 11^m$

τ $\sim 11^m$ Ru^{96}(10-Mev p,n) chem

D.J.Farmer, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), V7(1955); verbal report.

$\mathrm{Rh}^{99?}$
45 54

Ru^{99}(10-Mev p,n) chem
τ_1 15.0^d *2*
γ 0.089 sl ce
0.353
$(0.089\gamma)(0.353\gamma)$ $\gamma^{\pm}(0.089\gamma, 0.353\gamma)$

D.J.Farmer, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), V7(1955); verbal report.

Rh^{101}
45 56

τ_1 4.3^d Ru^{101}(10-Mev p,n) chem
γ 3* 0.158 α large M4 sl ce
K : L : M = 17 : 6 : 1
τ_2 4.3^h
γ 1* 0.307 K/LM ~ 7 sl ce,pe
*Relative intensity ce

D.J.Farmer, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), V7(1955); verbal report.

$\mathrm{Rh}^{<102}$ 45 57	τ_1		5^y *1*	Ru(10-Mev p,n)	chem
	γ		0.127	K/L~8	sl ce
			0.198		

$(0.127\gamma)(0.198\gamma)$ No $\gamma^{\pm}(0.127\gamma, 0.198\gamma)$

*Both γ's converted in Rh

D.J.Farmer, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), V7(1955); *verbal report.

Rh^{102} 45 57 210^d			Ru^{102}(10-Mev p,n)	chem
	γ	0.474	0.766	sl pe
		0.626	1.040	
		0.695	1.105	

No 0.086γ, 0.127γ, 0.198γ, 0.353γ

$(0.474\gamma)(0.626\gamma)$ $\gamma^{\pm}(0.474\gamma, 0.626\gamma)$

D.J.Farmer, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), V7(1955); verbal report.

Rh^{104} 45 59 4.3^m	β^-	0.026%*	(0.30)			Rh^{103}(pile n,γ)	
		0.12%*	(0.48)				
	γ	~100%*	0.051	IT			scin
		100+	0.556	1.4+	0.93		
		4.7+	0.745	0.6+	1.34		
		5.7+	0.78	1.9+	1.53		

No other γ with $0.05 < E_\gamma < 0.55$

$(0.556\gamma)(0.745 + 0.78\gamma, 0.93\gamma, 1.53\gamma)$

$(0.745 + 0.78\gamma)(0.78 + 0.745\gamma, 0.93\gamma, 1.34\gamma)$

$(1.34\gamma)(0.745\gamma, 0.93\gamma)$

*Calculated from γ intensities

+γ intensities in equilibrium mixture

M.E.Bunker, J.P.Mize, J.W.Starner, Phys. Rev. 99(1955); BAPS 30,#3(Washington), V6(1955); verbal report.

Rh^{104} 45 59 44^s	β^-	0.11%	0.64	Rh^{103}(pile n,γ);	sl $\beta\gamma$
		1.85%	1.88		sl $\beta\gamma$
		98%	2.44		scin, sl
	γ	100+	0.556		scin
		5.8+	1.24		

No other γ with $0.05 < E_\gamma < 0.55$

$(0.556\gamma)(1.24\gamma)$ No 1.80γ (< 0.3+)

M.E.Bunker, J.P.Mize, J.W.Starner, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), V6(1955); verbal report.

$\mathrm{Rh}^{106?}$ 45 61				Pd(30-Mev d)	chem
	τ		117^m	Pd(fast n)	chem
	β^-	~100%	0.7		a
		w	0.95 ?		

No β^+

Complex γ spectrum E_γ/β~4 Mev a, scin

Not d 1.0^yRu; not d short-lived Ru

Not produced by U, Th(30-Mev d, f)

G.B.Baró, W.Seelmann-Eggebert, I.E.Zabala, Z. Naturf. 10a, 80 (1955).

Rh^{106} 45 61 30^s	No delayed $\beta\gamma$ ($\tau_\gamma < 5\times10^{-10s}$)

V.Z.Wintersteiger, Bull. Inst. Nuclear Sci., Boris Kidrich 4, 79 (1954).

Rh^{106} 45 61 30^s	$(0.513\gamma)(0.624\gamma)$	d 1.0^yRu	Σscin

D.C.Lu, W.H.Kelly, M.L.Wiedenbeck, Phys. Rev. 97, 139 (1955).

Rh^{107} 45 62 24^m	τ_1	25^m	U, Ta^{181}(340-Mev p)	chem
	γ	0.095 *5*	d Ru	
		0.145 *5*		scin
		0.305 *5*		
		0.390 *10*		
		0.475 *10*		d Ru

W.E.Nervik, G.T.Seaborg, Phys. Rev. 97, 1092 (1955).

τ_1		23^m	d 4^mRu	chem
β^-	~100%	1.15		a
	w	~2		
γ		0.315		scin
		0.400		
		0.580		
		0.680		

Other weak γ's

G.B.Baró, P.Rey, W.Seelman-Eggebert, Z.Naturf. 10a, 81 (1955).

$\mathrm{Rh}^{107?}$ 45 62			U, Ta^{181}(340-Mev p)	chem
	τ_2	2.3^h	Not d ≥ 1^mRu	
	β^-	~1		s
	γ	0.195	1.06	scin
		0.225	1.20	
		0.510	1.26	
		0.630	1.50	
		0.715		

Mass assignment uncertain, possibly Rh^{106}

W.E.Nervik, G.T.Seaborg, Phys. Rev. 97, 1092 (1955).

$\mathrm{Rh}^{108?}$ 45 63	τ	18^s *1*	d ~4^mRu	chem
	β^-	4-5		a

Complex γ spectrum a, scin

Mass assignment uncertain, but not p 13^hPd

G.B.Baró, P.Rey, W.Seelman-Eggebert, Z.Naturf. 10a, 81 (1955).

Pd^{103} 46 57 17^d				Pd^{102}(pile n,γ)	chem
	γ	~100†	0.040		scin
		4†	0.065 *3*		
			~0.260?		
		12†	0.300 *5*		
		~66†	0.365 *5*		
		10†	0.495 *5*		

$(0.065\gamma)(0.300\gamma)$ No other $\gamma\gamma$ scin

Decay scheme proposed

†Photons per 10^5 disintegrations

B.Saraf, Phys. Rev. 97, 715 (1955); J.Franklin Inst. 258, 517A (1954).

Pd^{104} Level $\mathrm{Pd}^{104}(\alpha,\alpha'\gamma)$ $E_\alpha = 6.0$ scin
46 58 γ 0.550 8 $\tau_\gamma(E2) = 0.9\times10^{-11}\mathrm{s}^*$
stable

G.M.Temmer, N.P.Heydenburg, Phys. Rev. 99 (1955); BAPS 30, #3 (Washington), CA9(1955); *verbal report.

Pd^{105} $\mathrm{Pd}^{105}(\alpha,\alpha'\gamma)$ $E_\alpha = 6.0$ scin
46 59 γ 0.266 5
stable 0.433 7

G.M.Temmer, N.P.Heydenburg, Phys. Rev. 99 (1955); BAPS 30, #3(Washington), CA9(1955).

$\mathrm{Pd}^{105}(p,p'\gamma)$ $E_p = 2.6$
γ 0.270 $\epsilon B(E2) = 0.0084^*$ scin
0.430 $= 0.057^*$

G.Paulissen, H.Mark, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), CA6(1955); *verbal report.

Pd^{106} Level $\mathrm{Pd}^{106}(\alpha,\alpha'\gamma)$ $E_\alpha = 6.0$ scin
46 60 γ 0.510 8 $\tau_\gamma(E2) = 1.1\times10^{-11}\mathrm{s}^*$
stable

G.M.Temmer, N.P.Heydenburg, Phys. Rev. 99 (1955); BAPS 30, #3(Washington), CA9(1955); *verbal report.

Level $\mathrm{Pd}^{106}(p,p'\gamma)$ $E_p = 2.75$
γ 0.500 $\epsilon B(E2) = 0.18^*$ scin

G.Paulissen, H.Mark, Phys. Rev. 99(1955);BAPS 30, #3 (Washington), CA6(1955); *verbal report.

Pd^{108} Level $\mathrm{Pd}^{108}(\alpha,\alpha'\gamma)$ $E_\alpha = 6.0$ scin
46 62 γ 0.420 6 $\tau_\gamma(E2) = 2.7\times10^{-11}\mathrm{s}$
stable

G.M.Temmer, N.P.Heydenburg, Phys. Rev. 99 (1955); BAPS 30, #3 (Washington), CA9(1955); verbal report.

Level $\mathrm{Pd}^{108}(p,p'\gamma)$ $E_p = 2.75$
γ 0.425 $\epsilon B(E2) = 0.21^*$ scin

G.Paulissen, H.Mark, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), CA6(1955);*verbal report.

Pd^{110} Level $\mathrm{Pd}^{110}(\alpha,\alpha'\gamma)$ $E_\alpha = 6.0$ scin
46 64 γ 0.370 5 $\tau_\gamma(E2) = 4.4\times10^{-11}\mathrm{s}^*$
stable

G.M.Temmer, N.P.Heydenburg, Phys. Rev. 99 (1955); BAPS 30, #3 (Washington); CA9(1955); verbal report.

Level $\mathrm{Pd}^{110}(p,p'\gamma)$ $E_p = 2.75$
γ 0.365 $\epsilon B(E2) = 0.26^*$ scin

G.Paulissen, H.Mark, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), CA6(1955); *verbal report.

Ag γ $\mathrm{Ag}(n,?\gamma)$ $E_n = 3.2$ scin
47 0.74
1.10
1.50

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

Ag Levels $\mathrm{Ag}(p.p'\gamma)$ $E_p = 3.0$
47 γ 0.320 ~90% M1 $s\pi$ ce
stable 0.420 E2* *From K/L

E.M.Bernstein, H.W.Lewis, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), CA7(1955); verbal report.

Ag^{107} Levels $\mathrm{Ag}^{107}(p,p'\gamma)$ $E_p = 5$
47 60 $\mathrm{Ag}^{107}(\alpha,\alpha'\gamma)$ $E_\alpha = 5$
stable γ 0.319 scin
0.419

L.W.Fagg, E.A.Wolicki, R.O.Bondelid, K.L.Dunning, S.Snyder, Phys. Rev. 98 (1955). BAPS 30, #2 (Baltimore), G10.

Ag^{108} Resonances $\mathrm{Ag}^{(107)}(n)$ $E_n = 10$ to 75 ev
47 61 mod cyc
2.3^m

E_o (ev)	
(16.6)	$\sigma_o = 2.6\times10^3$
41.8	
45.3	
51.7	

See Ag^{110} for other Ag resonances

G.Grimm, L.J.Rainwater, W.W.Havens, Jr., Phys. Rev. 98 (1955). BAPS 30, #1 (New York), HA2; verbal report.

Ag^{109} Levels $\mathrm{Ag}^{109}(p,p'\gamma)$ $E_p = 5$
47 62 $\mathrm{Ag}^{109}(\alpha,\alpha'\gamma)$ $E_\alpha = 5$
stable γ 0.306 scin
0.412

L.W.Fagg, E.A.Wolicki, R.O.Bondelid, K.L.Dunning, S.Snyder, Phys. Rev. 98 (1955). BAPS 30, #2 (Baltimore), G10.

Ag^{110} IT 5% 4π pc, cryst
47 63 x 2.5% Ag K x ray
270^d 1.2% Cd K x ray
No ϵ_K (<0.5%) (Pd K x ray <0.6%)

H.Jaffe, UCRL-2537 (1954).

Ag^{110} No ϵ_K (<10%) (See 270^d Ag) cryst
47 63
24^s

H.Jaffe, UCRL-2537 (1954).

Resonance $\mathrm{Ag}^{(109)}(n,\gamma)$ mod cyc
(5.13 ev) $\sigma_o\Gamma^2 = 345 \pm 30$
Assuming $\Gamma_n/\Gamma = 0.11$

E.Melkonian, Phys. Rev. 96, 1006 (1954); 86, 603A (1952).

Ag^{110}
47 63
24^s

Resonances	$Ag^{(109)}(n)$	$E_n = 10$ to 75 ev mod cyc
	E_0 (ev)	
	30.6	
	40.6	
	56.1	
	71.4	

See Ag^{108} for other Ag resonances

G.Grimm, L.J.Rainwater, W.W.Havens, Jr., Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), HA2; verbal report.

Cd
48

γ	$Cd(n,?\gamma)$	$E_n = 3.2$ scin
0.69+	0.57	
0.020+	2.8	

+σ in barns

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

Resonances	$Cd(n,\gamma)$	$E_n = 0.025$ to 500 ev mod cyc
	E_0 (ev)	
	0.177 *5*	$\Gamma = 0.110$ *5* ev
		$\sigma_0 = 7.6\times10^3$ *3*
	~19	$\sigma_0\Gamma \sim 3$
	28	$\sigma_0\Gamma^2 = 9$
	100	

Other unresolved resonances with $E_0 > 100$

E.Meservey, Phys. Rev. 96, 1006 (1954); 86, 605A (1952).

Cd^{110}
48 62
stable

Level	$Cd^{110}(\alpha,\alpha'\gamma)$	$E_\alpha = 6.0$ scin
γ	0.654 *9*	$\tau_\gamma(E2) = 3.6\times10^{-12}s^*$

G.M.Temmer, N.P.Heydenburg, Phys. Rev. 99 (1955); BAPS 30, #3 (Washington), CA9(1955);
*verbal report.

Cd^{111}
48 63
stable

	0.247 level	d 2.8^d In
μ	−0.783 ± *0.028*	$\gamma\gamma(\theta,H)$

Measurement independent of quadrupole interaction

R.M.Steffen, W.Zobel, Phys. Rev. 97, 1188 (1955).

	0.247 level	Single In crystal
μ	−0.725 *47*	$\gamma\gamma(\theta,H)$
|q|	~1	

H.Albers-Schönberg, E.Heer, T.B.Novey, P.Scherrer, Helv. Phys. Acta 27, 547, 637 (1954).

Level	$Cd^{111}(\alpha,\alpha'\gamma)$	$E_\alpha = 6.0$ scin
γ	0.340 *6*	$\tau_\gamma(E2) = 1.6\times10^{-10}s^*$

G.M.Temmer, N.P.Heydenburg, Phys. Rev. 99 (1955); BAPS 30, #3 (Washington), CA9(1955);
*verbal report.

Level	$Cd^{111}(p,p'\gamma)$	$E_p = 2.75$
γ	0.330	$\epsilon B(E2) = 0.027$ scin

G.Paulissen, H.Mark, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), CA6(1955); verbal report.

Cd^{112}
48 64
stable

Level	$Cd^{112}(\alpha,\alpha'\gamma)$	$E_\alpha = 6.0$ scin
γ	0.620 *9*	$\tau_\gamma(E2) = 4.5\times10^{-12}s^*$

G.M.Temmer, N.P.Heydenburg, Phys. Rev. 99 (1955); BAPS 30, #3 (Washington), CA9(1955);
*verbal report.

Level	$Cd^{112}(p,p'\gamma)$	$E_p = 2.75$
γ	0.610	$\epsilon B(E2) = 0.13$ scin

G.Paulissen, H.Mark, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), CA6(1955); verbal report.

Cd^{113}
48 65
stable?

Levels	$Cd^{113}(\alpha,\alpha'\gamma)$	$E_\alpha = 6.0$ scin
γ	0.290 *5*	$\tau_\gamma(E2) = 1.1\times10^{-9}s$
	0.550?	

G.M.Temmer, N.P.Heydenburg, Phys. Rev. 99 (1954); BAPS 30, #3 (Washington), CA9(1955)
*verbal report.

Level	$Cd^{113}(p,p'\gamma)$	$E_p = 2.75$
γ	0.290	$\epsilon B(E2) = 0.058^*$ scin

G.Paulissen, H.Mark, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), CA6(1955); *verbal report.

Levels	$Cd^{112}(d,p)$	$E_d = 15.1$
	g.s. Q = 4.10 *9*	scin
	0.55 *8*	

N.S.Wall, Phys. Rev. 96, 664 (1954).

Cd^{114}
48 66
stable

Level	$Cd^{114}(\alpha,\alpha'\gamma)$	$E_\alpha = 6.0$ scin
γ	0.550 *8*	$\tau_\gamma(E2) = 0.8\times10^{-11}s^*$

G.M.Temmer, N.P.Heydenburg, Phys. Rev. 99 (1955); BAPS 30, #3 (Washington), CA9(1955);
*verbal report.

Level	$Cd^{114}(p,p'\gamma)$	$E_p = 2.75$
γ	0.545	$\epsilon B(E2) = 0.14^*$ scin

G.Paulissen, H.Mark, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), CA6(1955)*verbal report.

Capture γ's	$Cd^{(113)}(n,\gamma)$		(x)pe sl
89+	0.557 *3*	10+	1.308 *8*
20+	0.651 *4*	13+	1.388 *8*
7+	0.728 *5*	5+	1.500 *15*
7+	0.803 *5*	6+	1.655 *10*
10+	1.215 *8*		

H.Motz, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), TA12(1955).

Cd^{115} γ 10† 0.485 scin
48 67 74† 0.935
43^{d} 31† 1.30
No 0.12 γ, 0.450 γ, 0.500 γ scin, $\gamma\gamma$
(0.485 γ)(0.935 γ)(θ) ~isotropic
No (1.30 γ) γ

J.Varma, C.E.Mandeville, Phys. Rev. 97, 977 (1955); Phys. Rev. 95, 613A (1954).

Cd^{115} $\mathrm{Cd}^{(114)}$(pile n,γ) chem
48 67 β^- 37% {(0.59) (0.63)} 63% {(0.86) (1.11)} sl
2.25^{d}
γ 10† 0.230 220† 0.490 scin
30† 0.260 430† 0.523
3† 0.263 No 0.858 γ
(0.860 β)(0.260 γ) (0.260 γ)(0.230 γ, 0.263 γ?)
No (E_β > 0.62)(0.490 γ, 0.523 γ)
x(0.490 γ)/0.490 γ = 0.03

J.Varma, C.E.Mandeville, Phys. Rev. 97, 977 (1955).

Cd^{116} Level $\mathrm{Cd}^{116}(\alpha,\alpha'\gamma)$ E_a = 6.0 scin
48 68 γ 0.508 *8* τ_γ(E2) = $1.1 \times 10^{-11 s}$*
stable

G.M.Temmer, N.P.Heydenburg, Phys. Rev. 99 (1955); BAPS 30, #3 (Washington), CA9(1955); *verbal report.

In^{111} (0.172 γ)(0.247 γ)(θ) $\eta(\pi)$ = -0.181 *5*
49 62 Influence of viscosity of solvent studied
2.8^{d}

R.M.Steffen, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), V8 (1955).

In^{113} γ (0.392) α = 0.44 ic
49 64 Authors conclude γ is E5 d 118^{d}Sn
1.73^{h}

I.A.Antonova, I.V.Estulin, Izvest. Akad. Nauk Ser. Fiz. SSSR 18, 79 (1954).

In^{113} τ(L x ray) > 10^{14y} pc
49 64 τ(K x ray) > 10^{16y}
stable

J.Heintze, Z. Naturf. 10a, 77 (1955).

In^{115} γ (0.335) α = 0.82 ic
49 66 Authors conclude γ is E5 d 2.3^{d}Cd
4.5^{h}

I.A.Antonova, I.V.Estulin, Izvest. Akad. Nauk Ser. Fiz. SSSR 18, 79 (1954).

d 2.25^{d}Cd chem
γ 0.335 α_K = 0.83 M4 sl, scin
K/LM = 3.85 L/M > 10

J.Varma, C.E.Mandeville, Phys. Rev. 97, 977, (1955).

In^{115} γ $\mathrm{In}^{(115)}$(n,?γ) E_n = 3.2 scin
49 66 0.160+ 0.77 0.100+ 1.15
6×10^{14y} 0.270+ 0.88 0.160+ 2.1
+σ in barns

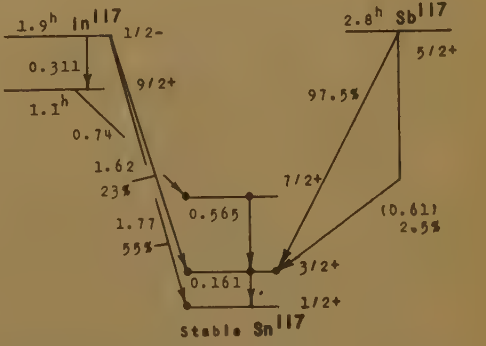
V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

In^{116} Resonances $\mathrm{In}^{(115)}$(n) E_n = 0.3 to 12 ev
49 67 E_0 (ev) σ_0
13^{s} 1.458 39 100
3.86
9.04

J.Moore, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), 83(1955); verbal report.

In^{117} τ_1 1.90^{h} *5* d 50^{m}Cd chem
49 68 β^- 23% 1.616 *5* sl
1.9^{h} 55% 1.772 *5*
γ 0.161 *1* α_K = 0.01 scin, sl ce
K/LM = 8.3
22% 0.311 *2* α_K = 1.3 M4
β(0.161 γ) No (0.311 γ)(β,γ)
p 1.1^{h}In 22% Not d 3.0^{h}Cd (< 10%)

In^{117} τ_2 1.1^{h} *1* d 3.0^{h}Cd chem
49 68 β^- 0.74 *1* sl
1.1^{h} γ 0.161 *1* scin, sl ce
0.565 *7* α~0.005
No 0.726 γ (< 1% of 0.565 γ) scin
(0.565 γ)(β, 0.161 γ)
Not p 14^{d}Sm (<1%)



C.L.McGinnis, Phys. Rev. 97, 93 (1955); 94, 780A (1954).

Sn γ Sn(n,?γ) E_n = 3.2 scin
50 0.14† 0.69
1.67† 1.14
0.21† 2.0
†σ in barns

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

Sn^{125} 50 75 9.9^d	τ_1	9.7^d		Sn^{124}(pile n,γ)	chem
	β^-	~0.4		a $\beta\gamma$	scin
		~1.3		a $\beta\gamma$	scin
		~2.4			a
	γ	0.34 *1*	1.07 *1*		scin
		0.47 *1*	1.41 *2*		
		0.81 *1*	1.97 *2*		
		0.90 *1*			

$(1.07\gamma)(0.34\gamma, 0.47\gamma, 0.81\gamma, 0.90\gamma)$ scin
$(0.47\gamma)(1.07\gamma, 1.41\gamma)$ $(1.41\gamma)(0.47\gamma)$
No $(E_\gamma > 1.5)$ γ

Sn^{125} 50 75 9.5^m	τ_2	9.4^m	Sn^{124}(pile n,γ)	chem
	γ	0.326		scin
		0.64		
		1.07		
		1.39		

$(0.326\gamma)(1.39\gamma)$ $(1.07\gamma)(0.64\gamma)$ scin

S.B.Burson, J.M.LeBlanc, D.W.Martin, Phys. Rev. 99(1955); BAPS 30, #3(Washington), V10(1955); verbal report.

Levels	Sn^{124}(d,p)	$E_d = 15.1$	
	g.s	Q = 3.52 *7*	scin
	1.16 *8*		
	2.77 *10*		
	3.41 *10*		
	4.09 *10*		

N.S.Wall, Phys. Rev. 96, 664 (1954).

$Sn^{130?}$ 50 80 57^m	τ	57^m *2*	U(30-Mev d,f)	chem
	p 10^mSb chem		U(n,f)	chem

I.Fränz, J.Rodriquez, H.Carminatti, Z. Naturf. 10a, 82 (1955).

Sb^{116} 51 65 60^m	τ_1		60^m	$In^{(115)}$(26-Mev α,3n)	chem
	γ	15†	0.41 *2*		scin
		130†	0.95 *5*		
		150†	1.31 *5*		

Yield 15.5^mSb/60^mSb ~const. for $E_\alpha = 26$ to 52
†Photons per 100 β^+

A.H.W.Aten, Jr., J.Manassen, G.D.de Feyfer, Physica 20, 665 (1954).

Sb^{116} 51 65 15.5^m	τ_2	14^m	$In^{(115)}$(26-Mev α,3n)	chem
	β^+	2.4 *2*		a
	γ	2.2 *1*		scin

Lower-energy γ's probably present
Yield 15.5^mSb/60^mSb ~const. for $E_\alpha = 26$ to 52

A.H.W.Aten, Jr., J.Manassen, G.D.de Feyfer, Physica 20, 665 (1954).

Sb^{117} 51 66 2.8^h			$In^{(115)}$(22-Mev α,2n)
	γ	0.161	K/LM = 8.3 scin, sl ce

No 0.565γ (< 0.5%)
$\beta^+/\epsilon = 0.028$ from $\gamma^\pm(0.161\gamma)/(0.161\gamma) = 0.05$
indicating E_{β^+}(allowed) = 0.61
No ϵ to g.s. (< 5%) from $x\gamma/x = 0.68$

C.L.McGinnis, Phys. Rev. 97, 93 (1955).

Sb^{118} 51 67 5.1^h	β^+	0.7	6^dTe source	a $\beta\gamma$

$(0.7\beta)\gamma$
See $3.5^m Sb^{118}$

R.W.Fink, Thesis, Univ. of Rochester, 1953.

Sb^{118} 51 67 3.5^m	β^+	3.10 *5*	6^dTe source	s
	γ	0.108		s ce

No $(3.10\beta)\gamma$ p 5.1^hSb?
0.108γ assumed IT to 5.1^hSb

R.W.Fink, Thesis, Univ. of Rochester 1953.

Sb^{120} 51 69 5.8^d	τ_1		5.8^d *22*	Sn^{119}(15-Mev d,n)chem		
	γ	1770*	0.090 *1*	K/LM = 8.3	E1	sl ce
		1000*	0.200 *1*	K/LM = 4.6	E2	
		10.4*	1.035 *5*		E2	
		7.8*	1.180 *5*		E2	

$(0.09\gamma)(0.20\gamma)(\theta)$ $\Delta J = 1(D), 2(Q)$ scin
$(0.20\gamma)(1.04+1.18\gamma)(\theta)$ $\Delta J = 2(Q), 2(Q)$
$(1.04\gamma)(1.18\gamma)(\theta)$ $J = 4, 2, 0$
$(x)(0.09\gamma, 0.20\gamma, 1.04+1.18\gamma)$delay = $11^{\mu s**}$
Not p 16.4^mSb ($\beta^+ < 0.3\%$) scin
*Relative intensity ce

C.L.McGinnis, Phys. Rev. 98 (1955). BAPS 30, #1 (New York), MA5; **verbal report.

Sb^{120} 51 69 16.4^m	γ	1.18		scin
	$(1.18\gamma)/\beta^+ = 0.03$		$Sb^{(121)}$($\leq$50-Mev γ,n)	

C.L.McGinnis, Phys. Rev. 98 (1955). BAPS 30, #1 (New York), MA5.

Sb^{122} 51 71 2.75^d	β	12%	0.72 *2*	$Sb^{(121)}$(pile n,γ)	sl
		7%	0.90 *5*		
		60%	1.41 *1*	F-K plot linear	
		21%	1.97 *1*	$\Delta J = 2$, yes shape	
	γ		0.558		sl pe
			0.687		

$(1.41\beta, \sim 0.90\beta)\gamma$ sl
$(0.90\beta, 0.72\beta)(1.1\text{–}1.2\gamma)$
$(E_\beta = 0.3)(0.56\gamma, 0.69\gamma)$
$(E_\beta = 1.1)(0.56\gamma)$, no $(E_\beta = 1.1)(0.69\gamma)$

J.Moreau, Compt. rend. 239, 1130 (1954).

ϵ_K 2.6% (Sn K x ray 2.2%) 4π pc, cryst

H.Jaffe, UCRL-2537 (1954).

Resonances Sb^{121}(n) chopper

E_0 (ev)	Γ_n (10^{-3}ev)	Γ_γ (10^{-3}ev)
6.23	2.4	69
15.3	5.0	125
29.7	2.4	126

A.Stolovy, J.A.Harvey, Phys. Rev. 99(1955); BAPS 30, #3(Washington), B9(1955); priv. comm.

Sb^{124} No ϵ_K (<0.1%) (K x ray ~0.4%) 4π pc
51 73
60^d H.Jaffe, UCRL-2537 (1954).

	Sb^{123}(n)		chopper
Resonance	E_o (ev)	Γ_n (10^{-3}ev)	Γ_γ (10^{-3}ev)
	21.4	25	89

A.Stolovy, J.A.Harvey, Phys. Rev. 99(1955);
BAPS 30, #3(Washington), B9(1955); priv comm.

$\mathrm{Sb}^{130?}$ τ 10.3^m *3* d 57^mSn chem
51 79 β^- 2.9
10^m

I.Fränz, J.Rodriquez, H.Carminatti, Z.Naturf.
10a, 82 (1955).

Te γ Te(n, ?γ) E_n = 3.2 scin
52 0.72 1.43
1.10 2.3

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys.
Rev. 96, 386 (1954).

$\mathrm{Te}^{116?}$ τ $2\text{-}4^h$? I^{127}(240-Mev p) chem
52 64 p 10-20^mSb chem

B.Dropesky, E.O.Wiig, (1953), unpublished.

Te^{117} τ 2.5^h I^{127}(240-Mev p) chem
52 65 β^+ 2.5 *1* s
2.5^h p 2.8^hSb chem

B.Dropesky, E.O.Wiig, (1952), unpublished.

Cs^{133}(240-Mev p) chem
β^+ 2.5 *1* s

R.W.Fink, E.O.Wiig, (1952), unpublished.

Te^{118} τ 6.0^d I^{127}(240-Mev p) chem
52 66 p 3.5^mSb chem
6^d

B.Dropesky, E.O.Wiig, (1952), unpublished.

Te^{119} τ_2 16^h *2* I^{127}(240-Mev p) chem
52 67 γ 0.56 s ce
16^h No β^+ d 18^mI; p 39^hSb chem

B.Dropesky, Thesis, Univ. of Rochester (1953).

τ_2 16^h *2* Cs^{133}(240-Mev p) chem
No strong β^+ Probably d 18^mI

R.W.Fink, Thesis, Univ. of Rochester (1953).

Te^{123} τ(L x ray) $>10^{13y}$ pc
52 71 τ(K x ray) $>10^{15y}$
stable

J.Heintze, Z. Naturf. 10a, 77 (1955).

Te^{123}(p,p'γ) E_p = 5
Te^{123}($\alpha,\alpha'\gamma$) E_α = 5
γ 0.159 0.435 scin
0.274 0.500
0.342
(0.159γ)(0.274γ, 0.342γ) No(0.274γ)(0.342γ)

L.W.Fagg, E.A.Wolicki, R.O.Bondelid,
K.L.Dunning, S.Snyder, Phys. Rev. 98 (1955).
BAPS 30, #2 (Baltimore), G10; verbal report.

Te^{125} Te^{125}(p,p'γ) E_p = 5
52 73 Te^{125}($\alpha,\alpha'\gamma$) E_α = 5
stable γ 0.439 scin

L.W.Fagg, E.A.Wolicki, R.O.Bondelid,
K.L.Dunning, S.Snyder, Phys. Rev. 98 (1955).
BAPS 30, #2(Baltimore), G10; verbal report.

Te^{131} β^- 52% 0.42 Te^{130}(11-Mev d,p) chem
52 79 17% 0.57 sl
1.2^d 4.6% 0.98
4.7% 2.46
γ ~22% 0.180 *2* IT K/LM = 2.4 M4 sl ce
0.051 *2?* st 0.446 *4* sl pe
0.099 *1* 0.575 *12*
st 0.147 *1* st 0.773 *8*
0.239 *9* 0.842 *13*
0.275 *9* 1.12 *1*
st 0.331 *5* w 1.63 *2* ?
(0.773γ)(1.12γ, 0.842γ?) No(0.331γ)(0.773γ)
Decay scheme proposed

E.Hebb, Phys. Rev. 97, 987 (1955).

Te^{131} β^- 15% 1.35 Te^{130}(slow n,γ)
52 79 25% 1.69 1.2^dTe source; sl
25^m 60% 2.14
γ (0.147) scin
(0.446)
(0.773)
Decay scheme proposed

E.Hebb, Phys. Rev. 97, 987 (1955).

I^{119} τ 17^m *2* I^{127}(240-Mev p) chem
53 66 p 16^hTe chem
18^m

B.Dropesky, Thesis, Univ. of Rochester (1953).

I^{120} τ $\geq 1.1^h$ I^{127}(240-Mev p) chem
53 67 β^+ 4.0 *2* s

B.Dropesky, Thesis, Univ. of Rochester (1953).

τ $>1.3^h$ Cs^{133}(100-Mev p) chem
β^+ 4.0 *2* s

R.W.Fink, Thesis, Univ. of Rochester (1953).

I^{121} 53 68 1.5^{h}	τ	1.6^{h} *1*	Cs^{133}(240-Mev p)	chem
	β^{+}	1.13 *5*		s
	γ	0.213		s ce

p 17^{d}Te chem

R.W.Fink, Thesis, Univ. of Rochester (1953).

I^{127} 53 74 stable	Levels	$I^{127}(n,n'\gamma)$	E_n = 0.2 to 1.0	
		0.062 *2*	0.632 *6*	scin
		0.208 *2*	0.725 *10*	
		0.390?	1.000?	
		0.435		

D.A.Lind, J.J.Van Loef, Phys. Rev. 99(1955);
BAPS 30, #3(Washington), F8(1955);
verbal report; Phys. Rev. 98, 224A (1955).

Level	$I^{127}(n,n'\gamma)$	E_n = 0.2 to 2
γ	(0.20)	

Yield indicates direct decay to g.s.

J.B.Guernsey, A.Wattenberg, Phys. Rev. 98 (195
(1955).
BAPS 30, #1(New York), A1; verbal report.

γ		$I^{127}(n,?\gamma)$		E_n = 3.2	scin
		0.21	st	0.63	
		0.33		1.04 ?	
	st	0.42			

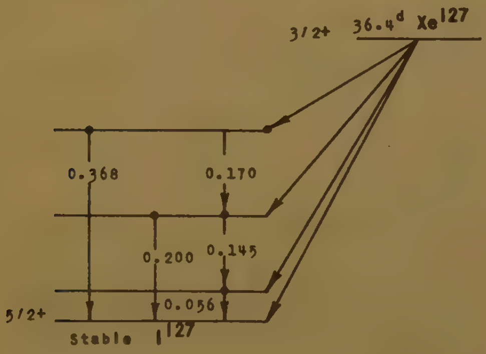
V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

I^{132} 53 79 2.26^{h}			d 78^{h}Te	chem
	τ	2.259^{h} *8*		ic

E.W.Emery, N.Veall, Nature 174, 889 (1954).

Xe^{127} 54 73 36.4^{d}	γ		0.056	I^{127}(32-Mev p,n)	chem
		vw	0.145		scin
			0.170		
		st	0.200		
			0.368		

No β^{+} (no $\gamma^{\pm}$) K x rays scin
(0.056 γ)(0.145 γ, 0.170 γ, K x rays)
(0.200 γ)(0.170 γ, K x rays)
(0.368 γ)(K x rays) No(0.368 γ) γ
No(0.200 γ)(0.056 γ, 0.145 γ)



H.B.Mathur, Phys. Rev. 97, 707 (1955).

Xe^{137} 54 83 3.9^{m}	β^{-}	3.5	U(d, f)	I chem	a
	γ				

S.J.Nassif, W.Seelmann-Eggebert, Z.Naturf. 10a, 83 (1955).

Xe^{138} 54 84 17^{m}			U(30-Mev d, f)	chem
	β^{-}	2.4		

E_{γ}/β = 1.3 Mev

S.J.Nassif, W.Seelmann-Eggebert, Z. Naturf. 10a, 83 (1955).

Cs^{126} 55 71 1.6^{m}	τ	1.6^{m} *2*	d 96^{m}Ba chem	ms
	β^{+}	3.8 *4*		a, scin
	γ	0.385 *5*		scin

No 0.48 γ(< 10% of 0.385 γ)
No γ with E_{γ} > 0.6(< 13% of 0.385 γ)
β^{+} : x : γ = 82 : 18 : 38
(0.385 γ)($\gamma^{\pm}$, << 3-Mev β^{+}) vβ^{+})
No (0.385 γ) (3.8 β^{+})

M.I.Kalkstein, J.M.Hollander, Phys. Rev. 96, 730 (1954).

Cs^{129} 55 74 31^{h}				Ta^{181}(340-Mev p)	chem
	γ	100†	0.375 *10*		scin
		9†	0.420 *10*		
		23†	0.585 *20*		

W.E.Nervik, G.T.Seaborg, Phys. Rev. 97, 1092 (1955).

Cs^{131} 55 76 10^{d}	J	5/2	M
	μ	+3.48 *4*	

E.H.Bellamy, K.F.Smith, Phil. Mag. 44, 33 (1953).

Cs^{134} 55 79 3.15^{h}	J	8	M
	μ	+1.10 *1*	

D.A.Gilbert, V.W.Cohen, Phys. Rev. 97, 243 (1955); 95, 569 (1954).

μ > 0 M

L.S.Goodman, S.Wexler, Phys. Rev. 97, 242 (1955).

β^{-} ~1% ~0.55 Cs^{133}(11-Mev d,p) sl
No 2.18 β^{-}

G.L.Keister, E.B.Lee, F.H.Schmidt, Phys. Rev. 97, 451 (1955).

Cs^{134} 55 79 2.3^{y}	J	4	M
	μ	+2.95 *1*	

E.H.Bellamy, K.F.Smith, Phil. Mag. 44, 33 (1953).

Cs^{134}
55 79
2.3^y

β^-	~32%	0.083 *3*	50%	0.655 *2*	sl
	~5%	0.31* *10*	~13%	0.683 *4*	

No ϵ (<1%, from absence of e_A) sl

			ce_K**		sl pe, ce
γ	2†	0.473 *2*	3	K/L	
	9†	0.563 *1*	11.9		
	13†	0.569 *1*	26		
	100†	0.605 *1*	100	7.7	
	91†	0.796 *1*	44	7.0	
	18†	0.801 *2*	3.9	K/LM	
	0.9†	1.038 *5*	0.43	~7	
	3.0†	1.168 *5*	0.49	~6	
	4.6†	1.367 *5*	0.49	~10	

0.203 γ not found (photons <0.2†, ce_K <1.2*)
0.663 γ seen, probably Cs^{137}
No $\gamma\gamma$ delay ($<0.2^{\mu s}$) scin
$(0.796\ \gamma)(E_\beta > 0.1)/(0.605\ \gamma)(E_\beta > 0.1) = 1.3 \pm 0.2$
Few, if any, (high E_β) (0.563 + 0.569 γ)
*Mean value for 2 components.
**Relative intensity of ce_K

G.L.Keister, E.B.Lee, F.H.Schmidt, Phys. Rev. 97, 451 (1955); 86, 632A (1952).

β^-	25%	0.088 *4*	Cs^{133} (slow n,γ);	s
	75%	0.654 *6*		

			a	K/LM
γ	10†	0.563 *2*	0.004	
	18†	0.569 *2*	0.006	
	100†	0.604 *2*		7.0
	100†	0.796 *3*		8.4
	8†	0.802 *3*	0.0026	
	1.1†	1.038 *4?*	0.002	7.6
	1.7†	1.166 *4?*	0.0015	8.4
	2.8†	1.367 *4*	0.0014	10.0

No β^+ (<0.1%)

A.A.Bashilov, N.N.Anton'eva, M.V.Blinov, B.S.Dzhelepov, Izvest. Akad. Nauk Ser. Fiz. SSSR 18, 43 (1954).

β^-	25%	0.078 *5*	5%	0.410 *15*	sl
	2%	0.210 *5*	68%	0.657 *5*	

		a	sl pe, ce
γ	0.4720 *15*	9.6×10^{-3}	E2
	0.5651 *21*	2.6×10^{-3}	E1
	0.5707 *10*	1×10^{-2}	M1
	0.6037 *6*	7.2×10^{-3}	M1 + E2
	0.7976 *13*	2.6×10^{-3}	M1 + E2
	0.8037	5×10^{-3}	E3
	1.0374 *30*		
	1.1687 *22*	4.5×10^{-4}	E1
	1.3687 *40*	9×10^{-4}	M1 + E2
	1.402		

H.H.Forster, J.S.Wiggins, Phys. Rev. 99 (1955) BAPS 30, #3 (Washington), V11 (1955); verbal Report.

γ	4†	0.2004 *15*		sd ce, pc
	4†	0.2083 *15*		
	4†	0.4753 *30*		

(CONTINUED)

Cs^{134}
55 79
2.3^y

15†	0.5652 *7*	
20†	0.5709 *7*	
100†	0.6058 *7*	K/L = 6.8
2†	0.6618 *20*	
100†	0.7970 *6*	K/L = 8.0
15†	0.8022 *6*	
4†	1.0345 *30*	
4†	1.168 *3*	
4†	1.370 *3*	

J.Verhaeghe, J.Demuynck, Compt. rend. 239, 1374 (1954).

			sl pe
γ	3.5†	0.467 *15*	
		0.553 *7*	
	21†	0.571 *7*	
	100†	0.607 *5*	
	100†	0.794 *3*	
		1.027 *15*	
	4†	1.164 *10*	
	5.3†	1.368 *5*	
		1.401 *15*	

M.C.Joshi, B.V.Thosar, Phys. Rev. 96, 1022 (1954).

γ sum peaks	1.175	Σ scin
	1.400	
	1.972	

D.C.Lu, M.L.Wiedenbeck, Phys. Rev. 94, 501 (1954).

No delayed $\beta\gamma$ ($\tau_\gamma < 5 \times 10^{-10s}$)

V.Z.Wintersteiger, Bull. Inst. Nuclear Sci., Boris Kidrich 4, 79 (1954).

No ϵ_K (<0.2%) (No Xe K x ray) 4π pc, cryst

M.Jaffe, UCRL-2537 (1954).

Ba
56

γ		Ba(n, ?γ)		E_n = 3.2	scin
	st	0.47		1.19	
		0.60	'st	1.41	
		0.78		1.51	
		1.06		2.1	

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

Resonances Ba(n,γ) E_n = 0.025 to 500 ev

E_o (ev)	$\sigma_o\Gamma^2$	mod cyc
25	8	
93	90	
380	550	

E.Melkonian, Phys. Rev. 96, 1006 (1954); 86, 605A (1952).

Ba^{124}?
56 68
$\sim 12^m$

τ $\sim 12^m$ $\mathrm{In}^{(115)}$(140-Mev N^{14},5n) chem

Possibly Ba^{127} but $6.3^h\mathrm{Cs}^{127}$ not detected

M.I.Kalkstein, J.M.Hollander, Phys. Rev. 96, 730 (1954).

Ba^{126}
56 70
96^m

τ 96.5^m *2.0* D 1.6^mCs chem
$\mathrm{In}^{(115)}$(140-Mev N^{14},3n)

γ	100†	0.225 *10*	scin
	33†	0.700 *30*	
	w	0.9 ?	
x	st	K x ray	

(0.225 γ) (0.70 γ) ?

M.I.Kalkstein, J.M.Hollander, Phys. Rev. 96, 730 (1954).

Ba^{127}?
56 71
$\sim 12^m$

τ $\sim 12^m$ $\mathrm{In}^{(115)}$(140-Mev N^{14},2n) chem

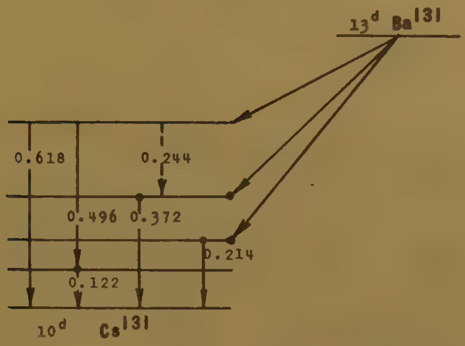
$6.3^h\mathrm{Cs}^{127}$ not detected, activity possibly Ba^{124}

M.I.Kalkstein, J.M.Hollander, Phys. Rev. 96, 730 (1954).

Ba^{131}
56 75
13^d

γ	st	0.122 $a\sim 0.6$	st	0.496	scin
	st	0.214	w	0.618	
	m	0.372	w	1.09*	

No 0.048 γ, 0.065 γ, 0.108 γ
(K x ray)(0.122 γ, 0.214 γ, 0.372 γ) Σ scin
(0.122 γ)(0.496 γ) No(0.214 γ)(0.372 γ)
No(0.122 γ)(0.214 γ, 0.372 γ)
*May be due to impurity



D.C.Lu, W.H.Kelly, M.L.Wiedenbeck, Phys. Rev. 97, 139 (1955).

Ba^{136}
56 80
stable

Resonances Ba^{135}(n) chopper

E_0 (ev)	Γ_n (10^{-3}ev)	Γ_γ (10^{-3}ev)
24.5	8.5	108
82.6	~180	~80
88.4		

A.Stolovy, J.A.Harvey, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), B9(1955); priv. comm.

Ba^{137}
56 81
2.60^m

γ (0.662) d 33^yCs sd ce
K : L : LM : MN = 52 : 10 : 13 : 2.8

J.Verhaeghe, J.Demuynck, Compt. rend. 239, 1374 (1954).

Ba^{137}
56 81
stable

Resonance Ba^{136}(n) chopper

E_0 (ev)
106.9

A.Stolovy, J.A.Harvey, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), B9(1955); priv. comm.

La^{138}
57 81
2×10^{11}y

J 5 I
μ +3.6848 *4*
$q(\mathrm{La}^{138})/q(\mathrm{La}^{139}) \cong 3.5 \pm 0.5$*

P.B.Sogo, C.D.Jeffries, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), BA9(1955); *verbal report.

La^{140}
57 83
40.2^h

τ 40.31^h *6* 4π
$\mathrm{La}^{(139)}$(th n,γ)

L.Yaffe, H.G.Thode, W.F.Merritt, R.C.Hawkins, F.Brown, R.M.Bartholomew, Can. J. Chem. 32, 1017 (1954).

τ 40.5^h *6*

β^-	16%	0.42 *4*	s
	12%	0.86 *3*	
	20%	1.15 *3*	
	30%	1.36 *2*	
	14%	1.62 *2*	
	8%	2.20 *2*	
γ	1.3*	0.331 *2*	K : L : M = 100 : 14 : 6
	0.46*	0.486 *3*	K : L : M = 32 : 8 : 4
	0.10*	0.810 *3*	
	0.14*	1.60 *1*	K : L = 11 : 2

*ce per 100 β^-

A.A.Bashilov, B.S.Dzhelepov, L.S.Chervinskaya, Izvest. Akad. Nauk Ser. Fiz. SSSR 18,88(1954).

			a	
γ	40†	0.328	~0.004	sl ce, scin
	6†	0.438		
	50†	0.490	~0.007	
	46†	0.815	~0.031	
	100†	1.60	~0.0008	
	1†	2.50 *5*		scin
	0.04†	3.00 *20*		

No (0.490 γ)(0.815 γ)
(0.490 γ)(1.60 γ)(θ) J = 4, 2, 0
(0.815 γ)(1.60 γ)(θ) Anisotropy < +5%, not < 0
(0.328 γ)(0.490 γ)(θ) Anisotropy < 0
(0.328 γ)(1.60 γ)(θ) Anisotropy < 0

C.H.Pruett, H.H.Bolotin, P.L.Roggenkamp, R.G. Wilkinson, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), YA2(1955); verbal report.

La^{140} Resonance La^{139}(n) chopper
$_{57}$ $_{83}$
40.2^{h}

E_0 (ev)	Γ_n (10^{-3}ev)	Γ_γ (10^{-3}ev)
73.5	24	147

A.Stolovy, J.A.Harvey, Phys. Rev. 99(1955); BAPS 30, #3(Washington), B9(1955); priv.comm.

Ce γ Ce(n,?γ) E_n = 3.2 scin
$_{58}$

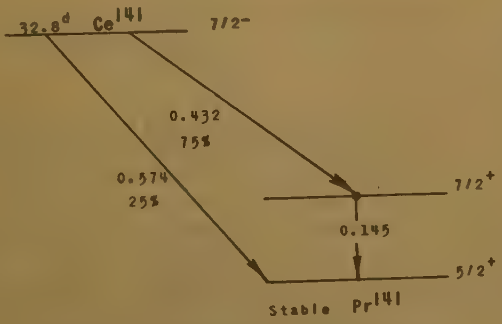
0.48	1.50
0.90	2.5

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

Ce^{139} La$^{(139)}$(11-Mev d,2n) chem
$_{58}$ $_{81}$ γ 0.1665 α_K = 0.20 $s\pi$ ce, scin
140^{d} K : L : MN = 82 : 10 : 2.5 M1
No harder γ (< 0.1%) No other ce
No β^+
K x ray/0.166γ = 1.0 ± 0.2 scin
e_A/ce$_K$ = 0.54 $s\pi$
ϵ_K/ce$_K$ = 4.4 ± 0.2 (xγ/γ)/(xx/x)
(K x ray)(0.166γ) delay < 10^{-8s} scin
$E_\epsilon \leq$ 0.15 (to 0.166 level) from coincidence
and single counting rates

C.H.Pruett, R.G.Wilkinson, Phys. Rev. 96, 1340 (1954); Phys. Rev. 95, 625A.

Ce^{141} Ce$^{(140)}$(pile n,γ) chem
$_{58}$ $_{83}$ β^- 75% 0.432 *2* F-K linear sl $\beta\gamma$
32.8^{d} 25% 0.574 *3* F-K linear sl
γ 0.1449 *7* α_K = 0.22 K/L=6.3 M1
sl ce,pe; scin
No other γ's
(0.432 β)(0.145 γ) No (0.574 β)(0.145 γ)



J.T.Jones, Jr., E.N.Jensen, Phys. Rev. 97, 1031 (1955).

Resonances Ce^{140}(n) E_n = 0.5 to 60 kev
Li(p,n)

	E_0 (kev)
	2.8 *1.0*
	6.7 *1.0*
st	10 *1*
st	22 *1*
st	43 *1*

R.C.Block, H.W.Newson, Phys. Rev. 98 (1955); BAPS 30, #1 (New York), HA10; verbal report.

Ce^{143} Ce^{142}(pile n,γ)
$_{58}$ $_{85}$ β^- ~0.3 (1.09) scin $\beta\gamma$
33^{h} ~0.5 (1.38)
(0.71)

γ 0.0574 *2* α_K ~ 9 sl ce,scin

0.232 *1*	0.668 *2*
0.294 *1*	0.724 *2*
0.351 *1*	0.861 *5*
0.493 *2*	1.10 *1**
0.565 *5**	*No ce

(1.38 β)(0.057 γ) delay < 1$^{\mu s}$
(0.057 γ)(0.294 γ) (0.232 γ)(0.493 γ)
β to g.s. weak if present

D.W.Martin, J.M.Cork, S.B.Burson, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), YA1(1955); verbal report.

Levels Ce^{142}(d,p) E_d = 15.1
g.s. Q = 2.86 *7* scin
0.90 *15*

N.S.Wall, Phys. Rev. 96, 664 (1954).

Resonances Ce^{142}(n) E_n = 0.5 to 125 kev
Li(p,n)

	E_0 (kev)
vst	1.6 *1.0*
st	3.2
st	4.2
w	9
st	16
st	26
st	44
	115

R.C.Block, H.W.Newson, Phys. Rev. 98 (1955). BAPS 30, #1 (New York), HA10 (1955).

Ce^{144} β^- 20% 0.160 *15* U(n,f)chem sd
$_{58}$ $_{86}$ ~5% 0.258 *15*
290^{d} 75% 0.327 *7*
γ 0.0334 $s\pi$ ce
0.0408
0.0532
0.0590 K/L < 1 No L_2
0.0799
K : L_1 : L_3 = 345 : 100 : ~15
0.0850
0.1335
K : L_1 : L_2 : L_3 = 53 : 10 : 0 : ~1
0.1452

No 0.0468γ, 0.0603γ, 0.100γ, 0.231γ
(0.134 γ)(0.033 γ, 0.041 γ)
(0.080 γ)(0.041 γ, 0.145 γ?)

J.M.Cork, M.K.Brice, L.C.Schmid, Phys. Rev. 96, 1295 (1954).

γ 29† (0.081) Σ scin
100† (0.134)

W.E.Kreger, C.S.Cook, Phys. Rev. 96, 1276 (1954).

Pr^{135} 59 76 22^m
τ 22^m p 22^hCe
Ce^{136}(22-Mev p,2n) chem
Not by Ce^{136}(9.5-Mev p,n)
β^+ 2.5 *1* a,scin
γ 0.080 scin
0.22
0.80

T.H.Handley, E.L.Olson, Phys. Rev. 96, 1003 (1954).

Pr^{136} 59 77 70^m
τ 70^m Ce^{136}(9.5-Mev p,n) chem
β^+ 2.0 *1* a,scin
γ 0.17 scin
~0.8 ?
~1.1 ?

T.H.Handley, E.L.Olson, Phys. Rev. 96, 1003 (1954).

Pr^{137} 59 78
τ $> 1^y$ or $< 5^m$ scin
No 1.4^h activity Ce^{138}(22-Mev p) chem

T.H.Handley, E.L.Olson, Phys. Rev. 96, 1003 (1954).

Pr^{138} 59 79 2.0^h
τ 2.0 *1* Ce^{138}(9.5-Mev p,n) chem
β^+ 1.4 *1* a,scin
γ 0.30 ~1.4 ? scin
0.80 ~1.7 ?
1.05

T.H.Handley, E.L.Olson, Phys. Rev. 96, 1003 (1954).

Pr^{139} 59 80 4.5^h
Nd^{142}(18-Mev p,α); $Ce^{(140)}$(fast p,2n)
τ 4.5^h p 140^dCe chem
β^+ 1.0 *1* a,scin
γ 0.17 in 140^dCe scin
1.3
1.6

T.H.Handley, E.L.Olson, Phys. Rev. 96, 1003 (1954).

Pr^{140} 59 81 3.5^m
τ 3.4^m Pr^{141}(22-Mev p,pn) chem
$Ce^{(140)}$(9.5-Mev p,n) chem

T.H.Handley, E.L.Olson, Phys. Rev. 96, 1003 (1954).

Pr^{141} 59 82 stable
Level $Pr^{(141)}(\gamma,\gamma)$
γ (0.145) $\tau = 3.5 \times 10^{-9}s$
Ce^{141} source rotated to compensate for recoil

F.R.Metzger, Phys. Rev. 99(1955); BAPS 30,#3 (Washington), BA8(1955).

Pr^{142} 59 83 19.2^h
γ 1.6 Pr^{141}(pile n,γ) scin
No other γ

B.Saraf, J.Varma, C.E.Mandeville, Phys. Rev. 98 (1955).
BAPS 30, #1(New York), SP1.

Levels Pr^{141}(d,p) $E_d = 15.1$
g.s. Q = 3.42 *30* scin
0.62 *10*

N.S.Wall, Phys. Rev. 96, 664 (1954).

Pr^{143} 59 84 13.8^d
No γ ($< 10^{-3}$%) scin

B.Saraf, J.Varma, C.E.Mandeville, Phys. Rev. 98 (1955).
BAPS 30, #1(New York), SP1.

Pr^{144} 59 85 17.5^m
β^- 1.5% 0.92 U(n,f) chem sd
98.5% 3.12
γ 0.688 scin
1.49
2.18
No 0.0603γ sr ce

J.M.Cork, M.K.Brice, L.C.Schmid, Phys. Rev. 96, 1295 (1954).

γ 12† (0.695) d 290^dCe scin
2.3† (1.48)
5.9† (2.18)
†Photons per 100 Ce^{144} 0.134 photons

W.E.Kreger, C.S.Cook, Phys. Rev. 96, 855A, 1276 (1954).

Nd 60
Resonance Nd(n) chopper
E_0(ev)
161

A.Stolovy, J.A.Harvey, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), 89(1955); priv. comm.

Resonance Nd(n) $E_n = 0.07$ to 20 ev
E_0(ev) $\sigma_0\Gamma^2$ cryst s
4.38 *4* 1-10

V.L.Sailor, H.H.Landon, H.L.Foote, Jr., Phys. Rev. 96, 1014 (1954).

Nd^{143} 60 83 stable
μ -1.1 *1* Enriched Nd^{143} s

K.Murakawa, Phys. Rev. 96, 1543 (1954).

$Nd^{143}(\alpha,\alpha'\gamma)$ $E_\alpha = 5.7$
No γ with $E_\gamma < 0.50$ scin

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), X6.

Nd^{143} Levels Nd^{142}(d,p) $E_d = 15.1$
60 83 g.s. $Q = 3.79$ *8* scin
stable 0.70 *10*

N.S.Wall, Phys. Rev. 96, 664 (1954).

Nd^{144} Nd$^{(144)}$(p,p'γ) $E_p = 3.34$
60 84 0.696γ not observed ($\sigma < 0.6$ mb) scin
stable

B.E.Simmons, D.M.Van Patter, K.F.Famularo, R.V.Stuart, Phys. Rev. 97, 89 (1955).

Resonances Nd^{143}(n) chopper

E_o (ev)
56.3
132
191

A.Stolovy, J.A.Harvey, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), 89(1955); priv. comm.

Nd^{145} μ −0.69 *10* Enriched Nd^{145} S
60 85
stable K.Murakawa, Phys. Rev. 96, 1543 (1954).

Level Nd^{145}(α,α'γ) $E_\alpha = 5.7$
γ 0.070 *2* $\epsilon B(E2) = 0.05$ scin

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), X6; verbal report.

Nd^{145} Level Nd$^{(145)}$(p,p'γ) $E_p \leq 3.34$
60 85 γ 0.071 *4* scin
stable

B.E.Simmons, D.M.Van Patter, K.F.Famularo, R.V.Stuart, Phys. Rev. 97, 89 (1955).

Nd^{146} Level Nd^{146}(α,α'γ) $E_\alpha = 5.7$
60 86 γ 0.455 *10* $\epsilon B(E2) = 0.6$ scin
stable

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), X6; verbal report.

Nd$^{(146)}$(p,p'γ) $E_p = 2.79$
0.455γ not observed ($\sigma < 1$ mb) scin

B.E.Simmons, D.M.Van Patter, K.F.Famularo, R.V.Stuart, Phys. Rev. 97, 89 (1955).

Resonances Nd^{145}(n) chopper

E_o (ev)	Γ_n (10^{-3}ev)	Γ_γ (10^{-3}ev)
4.32	0.90	55
43.2		
82.3 ?		
106		

A.Stolovy, J.A.Harvey, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), 89(1955); priv. comm.

Nd^{148} Level Nd^{148}(α,α'γ) $E_\alpha = 5.7$
60 88 γ 0.300 *6* $\epsilon B(E2) = 1.2$ scin
stable

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), X6; verbal report.

Level Nd$^{(148)}$(p,p'γ) $E_p = 2.2$ to 3.3
γ 0.300 *3* $\tau = 2.6 \times 10^{-10}$s* scin
σ ($E_p = 2.25$) = 0.7 mb
*Estimated assuming E2 Coulomb excitation

B.E.Simmons, D.M.Van Patter, K.F.Famularo, R.V.Stuart, Phys. Rev. 97, 89 (1955).

Nd^{150} τ_β $> 10^{16}$y pc
60 90 No β's with $0.006 < E_\beta < 0.3$ from 1.18g
$> 10^{15}$y natural Nd(2.1 mg/cm^2)

D.Dixon, A.McNair, Phil. Mag. 45, 1099(1954).

Level Nd^{150}(α,α'γ) $E_\alpha = 5.7$
γ 0.128 *3* $\epsilon B(E2) = 1.2$ scin

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 98, (1955).
BAPS 30, #1 (New York), X6; verbal report.

Level Nd^{150}(p,p'γ) $E_p = 1.8$ to 3.3
γ 0.131 *2* $\tau = 7 \times 10^{-9}$s* scin
Graph of σ agrees with E2 Coulomb excitation
(p)(0.131γ)(θ) σ ($E_p = 2.25$) = 2.4 mb
*Estimated assuming E2 excitation

B.E.Simmons, D.M.Van Patter, K.F.Famularo, R.V.Stuart, Phys. Rev. 97, 89 (1955).

Pm^{149} Nd^{150}(9-Mev p,2n) chem
61 88 β^- 0.97 s
50^h γ 0.285 scin
~1.0

V.K.Fischer, Phys. Rev. 96, 1549 (1954).

Pm^{150} τ 2.7^h Nd^{150}(9-Mev p,n) chem
61 89
2.7^h

β^-	~80%	2.01 *5*			sd
	~20%	3.05 *5*			
γ	100†	0.34 *1*		1.24?	scin
		0.39?	4†	1.32 *5*	
	20†	0.43 *2*	0.8†	1.67 *5*	
	40†	0.82 *2*	0.4†	2.0 *1*	
		0.96?	0.8†	2.6 *1*	
	4†	1.17 *5*	0.4†	3.0 *1*	

($E_\beta = 2$) (0.34, 0.43, 0.82, 1.17γ's)
($E_\beta \approx 2$) (1.32, 1.67, <2.5 γ's)
($E_\beta = 3$) (0.39?, 0.82, 1.24?, 1.32 γ's)
(0.34 γ)(0.39?, 0.43, 0.82, 1.32, 1.67, <2.0γ's)
Decay scheme proposed scin

V.K.Fischer, Phys. Rev. 96, 1549; 95, 626A (1954).

Sm
62

Resonances Sm(n) E_n = 0.07 to~22 ev
cryst

E_o (ev)		$\sigma_o\Gamma^{2*}$	Isotope**
0.0976	*5*	68 68	150
0.871	*5*	10-50	150
3.43	*2*	1-10	148
4.98	*5*	1-10	150
6.45	*10*	1-10	150 ?
8.2	*1*	>100	153
9.1	*2*	1-10	150 ?

E_o (ev)		$\sigma_o\Gamma^{2*}$	Isotope**
12.0	*5*	1-10	
15.2	*5*	1-10	150 ?
17.2	*5*	1-10	150 ?
19.1	*5*	50-100	148
27.1	*5*	50-100	151

*For natural Sm **Enriched samples used

V.L.Sailor, H.H.Landon, H.L.Foote, Jr., Phys. Rev. 96, 1014 (1954); 89, 904A (1953).

Sm^{147}
62 85
1.25×10^{11}y

$\mathrm{Sm}^{147}(\alpha,\alpha'\gamma)$ E_α = 5.7
No γ with E_γ < 0.50 scin

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 98, (1955).
BAPS 30, #1 (New York), X6.

Sm^{148}
62 86
stable

Level $\mathrm{Sm}^{148}(\alpha,\alpha'\gamma)$ E_α = 5.7
γ 0.562 *12* ϵB(E2) = 1.32 scin

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 98, (1955).
BAPS 30, #1 (New York), X6; verbal report.

Resonances Sm^{147}(n) E_n = 0.07 to~22 ev
cryst

E_o (ev)		$\sigma_o\Gamma^2$
3.43	*2*	10-50
19.1	*5*	> 100

See also Sm

V.L.Sailor, H.H.Landon, H.L.Foote, Jr., Phys. Rev. 96, 1014 (1954); 89, 904A (1953).

Sm^{149}
62 87
stable

$\mathrm{Sm}^{149}(\alpha,\alpha'\gamma)$ E_α = 5.7
No γ with E_γ < 0.50 scin

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), X6.

Sm^{150}
62 88
stable

Level $\mathrm{Sm}^{150}(\alpha,\alpha'\gamma)$ E_α = 5.7
γ 0.337 *7* ϵB(E2) = 1.80 scin

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), X6; verbal report.

Sm^{150}
62 88
stable

Resonances Sm^{149}(n) E_n = 0.07 to~22 ev
cryst

E_o (ev)		$\sigma_o\Gamma^2$
0.0976	*5*	490
0.871	*5*	>100
4.98	*5*	10-50
6.45	*10**	10-50
9.1	*2**	10-50
15.2	*5**	10-50
17.2	*5**	10-50

*Assignment uncertain See also Sm

V.L.Sailor, H.H.Landon, H.L.Foote, Jr., Phys. Rev. 96, 1014 (1954); 89, 904A (1953).

Sm^{151}
62 89
~70^y

Resonance Sm^{150}(n) E_n = 0.07 to~22 ev
cryst

E_o (ev)		$\sigma_o\Gamma^2$
21.1	*5*	>100

See also Sm

V.L.Sailor, H.H.Landon, H.L.Foote, Jr., Phys. Rev. 96, 1014 (1954); 89, 904A (1953).

Sm^{152}
62 90
stable

Level $\mathrm{Sm}^{152}(\alpha,\alpha'\gamma)$ E_α = 5.7
γ 0.122 *2* ϵB(E2) = 1.4 scin

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 98, (1955).
BAPS 30, #1 (New York), X6; verbal report.

Sm^{153}
62 91
47^h

β^-	67-45†	0.710		sl (β)(0.103γ)
	33-55†	0.640		sl (β)(0.103γ)

N.Marty, J. Phys. radium 15, 60S (1954).

β^{-**}	32%*	0.640 *15*		sl
	49%*	0.710 *15*		
	19%*	0.810 *10*		
γ	100†*	0.0690 *4*	α = 6 K/L > 4.6	sl ce, scin
		0.1025 *5*	K/L > 6.1 $\tau = 4.0\times10^{-9}$*	β(ce)
	0.033†*	0.1716	K/L = 4.5* $\tau = 1.4\times10^{-10}$*	β(ce)
	w	0.520		

(0.64 β)(0.1025 γ) (0.71 β)(0.069 γ)
†ce per 100 β^-
**Spectrum analyzed only for E_β > 0.35

R.L.Graham, J.Walker, Phys. Rev. 94, 794A (1954); *priv. comm.

Resonance Sm^{152}(n) E_n = 0.07 to~22 ev
cryst

E_o (ev)		$\sigma_o\Gamma^2$
8.2	*1*	> 100

See also Sm

V.L.Sailor, H.H.Landon, H.L.Foote, Jr., Phys. Rev. 96, 1014 (1954); 89, 904A (1953).

Sm^{154} Level $Sm^{154}(\alpha,\alpha'\gamma)$ $E_\alpha = 5.7$
62 92 γ 0.082 *2* $\epsilon B(E2) = 0.5$ scin
stable

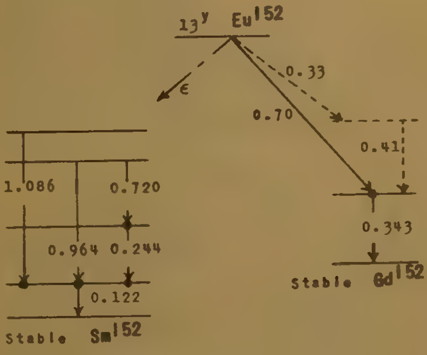
N.P.Heydenburg, G.M.Temmer, Phys. Rev. 98, (1955).
BAPS 30, #1 (New York), X6; verbal report.

Eu^{151} J 5/2 para
63 88 $\mu(Eu^{151})/\mu(Eu^{153}) = 2.24 \pm 0.03$
stable

B.Bleaney, W.Low, Proc. Phys. Soc. 68A, 55 (1955).

Eu^{152} β^- 0.33 *10?* $Eu^{152,154}$ source sl
63 89 0.70 *3* $\beta\gamma$
13^y

γ (0.122)* sl ce 0.41 ? scin
(0.244)* sl ce (0.720) scin
(0.343)* sl ce (0.964) scin
(1.086) scin
No 0.336 γ
(0.70 β) (ce_K 0.343 γ) sl
No β(ce_L 0.122 γ, ce_K 0.244 γ) sl
(ce 0.122 γ) (ce 0.244 γ, no ce 0.123 γ) sl
(x ray) (0.122 γ, 0.244 γ, 0.964 γ?) Σ scin
Sum peaks also at ~1.14? ~1.26 Σ scin
No (0.343 γ) (x ray, γ) Σ scin
*Assignment from ms results of Katz, Lee



R.E.Slattery, D.C.Lu, M.L.Wiedenbeck, Phys. Rev. 96, 465 (1954).

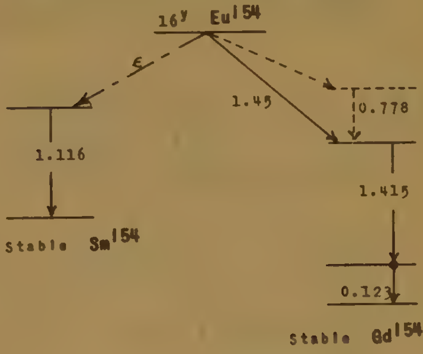
Resonance $Eu^{(151)}$(n) $E_n = 0.001$ to 0.01 ev
-0.0006 ev $\sigma_o = 8.4\times10^4$ cryst
$\Gamma_\gamma = 0.067$

M.Holt, Phys. Rev. 98 (1955)
BAPS 30, #1(New York), HA11.

Eu^{153} J 5/2 para
63 90 $\mu(Eu^{151})/\mu(Eu^{153}) = 2.24 \pm 0.03$
stable

B.Bleaney, W.Low, Proc. Phys. Soc. 68A, 55 (1955).

Eu^{154} β^- 1.45 *5* $Eu^{152,154}$ source sl
63 91 γ (0.123)* (1.116)* scin
16^y (0.778) ? 1.415**
No 0.336 γ
(1.415 γ) (x ray, 0.123 γ) Σ scin
No (0.123 γ) (x ray) Σ scin
No (0.778 γ) (x ray, γ) Σ scin
No (ce_L 0.123 γ)β sl
*Assignment from ms results of Katz, Lee
**Assignment from coincidences



R.E.Slattery, D.C.Lu, M.L.Wiedenbeck, Phys. Rev. 96, 465 (1954).

Gd Resonances Gd(n) $E_n = 0.07$ to ~ 35 ev
64 cryst

E_o(ev)	$\sigma_o\Gamma^2$
2.01 *1*	1-10
2.57 *2*	10-50
2.81 *3*	1-10
6.33 *6*	10-50
7.8 *1*	1-10
11.9 *2*	
16.9 *4*	
21.1 *5*	
22.5 *6*	
30.8 *8*	
34.0 *10*	

V.L.Sailor, H.H.Landon, H.L.Foote, Jr., Phys. Rev. 96, 1014 (1954).

Gd^{154} Level $Gd^{154}(\alpha,\alpha'\gamma)$ $E_\alpha = 5.7$
64 90 γ 0.123 *2* $\epsilon B(E2) = 2.1$ scin
stable

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 98, (1955).
BAPS 30, #1 (New York), X6; verbal report.

Gd^{155} J ≥ 5/2 S
64 91 μ -0.19 *5* assuming J = 7/2
stable

K.Murakawa, Phys. Rev. 96, 1543 (1954).

Gd^{155}
64 91
stable

Level	$Gd^{155}(\alpha,\alpha'\gamma)$	$E_\alpha = 5.7$	
γ	0.146 *3*	$\epsilon B(E2) = 0.11$	scin

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), X6; verbal report.

Gd^{156}
64 92
stable

Level	$Gd^{156}(\alpha,\alpha'\gamma)$	$E_\alpha = 5.7$	
γ	0.089 *2*	$\epsilon B(E2) = 1.2$	scin

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), X6; verbal report.

Gd^{157}
64 93
stable

J	$\geq 5/2$	s
μ	−0.33 *6* assuming $J = 7/2$	

K.Murakawa, Phys. Rev. 96, 1543 (1954).

Level	$Gd^{157}(\alpha,\alpha'\gamma)$	$E_\alpha = 5.7$	
γ	0.131 *3*	$\epsilon B(E2) = 0.08$	scin

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 98, (1955).
BAPS 30, #1 (New York), X6; verbal report.

Gd^{158}
64 94
stable

Level	$Gd^{158}(\alpha,\alpha'\gamma)$	$E_\alpha = 5.7$	
γ	0.079 *2*	$\epsilon B(E2) = 1.0$	scin

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), X6; verbal report.

Tb^{159}
65 94
stable

J	3/2	para
μ	1.5 *4*	

J.M.Baker, B.Bleaney, Proc. Phys. Soc. 68A, 257 (1955).

γ	$Tb^{159}(\alpha,\alpha'\gamma)$	$E_\alpha = 5.7$	
	0.079 *2*	$\epsilon B(E2) = 0.19$	scin
	0.136 *3*	= 0.04	

σ graphs show both γ's from 0.136 level

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), X6; verbal report.

Tb^{160}
65 95
73^d

τ		72.3^d *5*			
β^-	19%	0.28 *4*	32%	0.557 *15*	s
	19%	0.46 *2*	30%	0.851 *10*	

γ	0.064	0.297		s ce,pe
	0.0862	0.391	0.962	
	0.093	0.411	0.976	
	0.156	0.466	1.034	
	0.181	0.569	1.110	
	0.196	0.679	1.173	
	0.214	0.762	1.196	
	0.234	0.856	1.250	
	0.274	0.876	1.266	
	0.282	0.915	1.447	

(CONTINUED)

Tb^{160}
65 95
73^d

(ce_L 0.086γ)(ce_K 0.196γ, ce_K 0.297γ) s ce
The above 29 most intense γ's (out of 70γ's found) fitted into 8 levels

V.Keshishian, H.W.Kruse, R.J.Klotz, C.M.Fowler, Phys. Rev. 96, 1050 (1954).

Tb^{159}(pile n,γ)

γ	0.0869 *3*	$\alpha_K \leq 1.7$	cryst
No ϵ_K (<0.7%)		(Dy K x ray <0.6%)	4π pc

γ	12†	0.087	34†	0.96	scin
	5†	0.195	25†	1.18	
	14†	0.290	11†	1.27	
	34†	0.89	16†	K x rays	

(1.18 or 1.27 γ)(0.087 γ and no other γ)
(0.087 γ)(0.89 γ) No (0.087 γ) (0.96 γ)
†Photons per 100 disintegrations

H.Jaffe, UCRL-2537 (1954).

Resonances Tb^{159}(n) E_n = 0.07 to 13 ev

E_o (ev)	$\sigma_o\Gamma^2$	cryst
3.37 *3*	10–50	
5.4 *2* ?	1–10	
10.6 *3*	10–50	
11.4 *2*	50–100	

V.L.Sailor, H.H.Landon, H.L.Foote, Jr., Phys. Rev. 96, 1014 (1954).

Tb^{161}
65 96
6.8^d

γ	0.0488 *2*	Tb^{159}(pile n)	cryst

H.Jaffe, UCRL-2537 (1954).

Dy
66

Resonances Dy(n) E_n = 0.07 to ~ 80 ev

E_o (ev)	$\sigma_o\Gamma^2$	cryst
1.72 *1*	10–50	
2.73 *2*	1–10	
3.70 *3*	1–10	
4.36 *5*	1–10	
5.49 *4*	>100	
7.8 *2*		
9.9 *5*	<1	
10.6 *15*	10–50	
13.5 *5*		
16.8 *3*		
19.7 *5*		
74 *15*	50–100	

V.L.Sailor, H.H.Landon, H.L.Foote, Jr., Phys. Rev. 96, 1014 (1954); 91, 450A (1953).

Ho^{160} τ 5.0^h d $29^h Er$ chem
$_{67}$ $_{93}$
5.0^h γ 0.087 scin
0.194
0.65
0.73
0.89
0.97

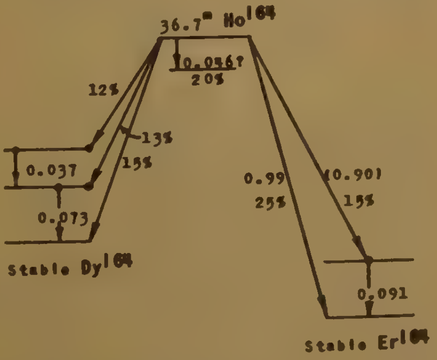
Formerly assigned to Ho^{162}(see Phys. Rev. 94, 945, 1954).

W.E.Nervik, G.T.Seaborg, Phys. Rev. 97, 1092 (1955).

Ho^{164} τ 36.7^m *5* $Ho^{165}(\leq 22\text{-Mev } \gamma, n)$
$_{67}$ $_{97}$
36.7^m β^- 38† (0.90)
62† 0.99 *3* sd
No β^+ (< 0.08†) scin

γ 3.6† 0.0373 *5* $\alpha_L \sim 10$ DC,sd ce
0.046 IT*?
3.3† 0.0728 *5* $\alpha_K = 2.7$ E2 xx/xγ
$\tau = 1.4 \times 10^{-9s}$? xγ
3.5† 0.0905 *5* $\alpha_K = 1.9$ E2 βx/βγ
$\tau = 1.4 \times 10^{-9s}$ βγ
x 90† K x ray + 0.046γ
No Ho K x ray (< 27†) No Er K x ray (< 18†)

(β) (ce 0.091γ) No (β) (ce 0.046γ) sd
(β) (x ray)/ (β) (0.091γ) = 1.8
(x ray) (0.037γ, 0.073γ),
No (0.037γ)(0.073γ)
Assignment to IT based on:
$\epsilon_K/\beta = 0.9 \pm 0.2$ from $x/\beta = 0.9 \pm 0.2$
$(< 0.164\text{-Mev pulses})/\beta = 1.30 \pm 0.15$ Σ scin



H.H.Brown, R.A.Becker, Phys. Rev. 96, 1372 (1954); 95, 626A (1954).

Ho^{166} β^- 0.76% 0.393 sl βγ
$_{67}$ $_{99}$
27.3^h 47.6% 1.771 *7* ΔJ = 2,yes shape sl βγ
51.6% 1.854 *5* F-K plot linear sl

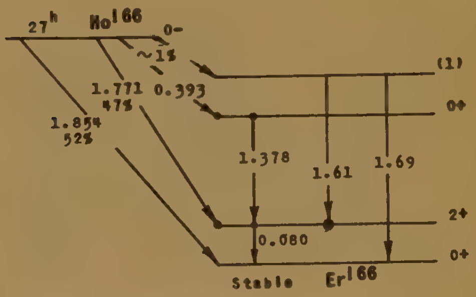
γ 0.0803 *2* $\alpha_K = 1.9$ E2 sl ce
K : L : MN = 10 : 25 : 7
0.76% 1.380 $\alpha_K = 1.7 \times 10^{-3}$ E2

No 0.184γ ($ce_K < 10^{-3}$%)
(1.77β)(0.080γ, ce_L 0.080γ) delay = 1.8×10^{-9s}
(1.77β)(0.080γ)(θ) J = 0, 2, 0 assuming
same attenuation as for γγ(θ)

R.L.Graham, J.L.Wolfson, M.A.Clark, Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), MA11; verbal report.

Ho^{166} γ 0.080 scin
$_{67}$ $_{99}$
27.3^h 1.378 *7*
1.61 *2*
1.69 *2*
(0.080γ)(1.38γ)(θ) J = 0, 2, 0
(0.080γ)(1.61γ)(θ) J = 1, 2, 0
No (0.080γ)(1.69γ)
Attenuation of γγ(θ) coefficients shows quadrupole interaction

J.S.Fraser, J.C.D.Milton, Phys. Rev. 98(1955).
Proc. Roy. Soc. Canada 48, 12A (1954).
BAPS 30, #1 (New York), MA10.

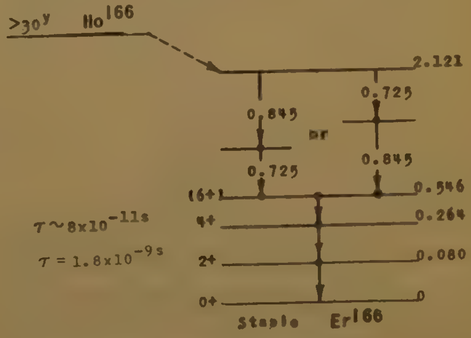


R.L.Graham, J.L.Wolfson, M.A.Clark, Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), MA11; verbal report.

Ho^{166} γ 0.0803 *2* sl ce
$_{67}$ $_{99}$
$> 30^y$ 0.1841 *10*
0.282 *4*
(0.080γ)(0.184γ) delay = $18.2 \pm 0.6 \times 10^{-10s}$
(0.184γ)(0.282γ) delay = $8 \pm 5 \times 10^{-11s}$ scin
g.s. and first 3 excited states form a rotational band (from energy spacing)

R.L.Graham, M.A.Clark, Phys. Rev. 98 (1955); quoted by Milton, Fraser, Milton.
BAPS 30, #1 (New York), MA12; verbal report.

Ho^{165}(pile n,γ) chem
scin
γ 1† 0.080
~1† 0.188 *5*
~1† 0.283 *10*
~1† 0.725 *20*
~1† 0.845 *20*
(0.080γ)(0.188γ)(θ) J = 4, 2, 0*
All 5 γ's in cascade γγ scin
(0.725γ, 0.845γ)(most of the x rays)*
Delay 0.284 level ~ 8×10^{-11s}*
No βγ delay (< 2×10^{-9s})



J.C.D.Milton, J.S.Fraser, G.M.Milton, Phys. Rev. 98 (1955).
BAPS 30, #1(New York), MA12; verbal report.

$_{68}$Er

Resonances Er(n) $E_n = 0.07$ to ~30 ev

E_0 (ev)	$\sigma_0\Gamma^2$	cryst
0.47 *1*	10-50	
0.58 *1*	10-50	
6.10 *6*	50-100	
9.62 *9*	10-50	
16.2 *2*	10-50	
21.2 *3*		
27.5 *4*		

V.L.Sailor, H.H.Landon, H.L.Foote, Jr., Phys. Rev. 96, 1014 (1954); 90, 362A (1953).

Er^{160}
68 92
29^h

τ 29^h Ta^{181}(340-Mev p) chem
No γ
p 5.0^{h}Ho chem Not p 22^{m}Ho chem

W.E.Nervik, G.T.Seaborg, Phys. Rev. 97, 1092 (1955).

Er^{161}
68 93
3.1^h

τ 3.1^h Ta^{181}(340-Mev p) chem
β^+ 1.2 s

W.E.Nervik, G.T.Seaborg, Phys. Rev. 97, 1092 (1955).

Tm^{166}
69 97
7.7^h

γ	0.080	0.67	scin
	0.112	0.80	
	0.140	1.32	
	0.180		

γ's observed with 54^{h}Yb source but assumed to belong to Tm^{166}

W.E.Nervik, G.T.Seaborg, Phys. Rev. 97, 1092 (1955).

Tm^{167}
69 98
9.6^d

τ 9.6^d Ta^{181}(340-Mev p) chem

γ	100†	0.049	9†	0.515	scin
	2†	0.115	18†	0.720	
	29†	0.202			

W.E.Nervik, G.T.Seaborg, Phys. Rev. 97, 1092 (1955).

Tm^{169}
69 100
stable

J 1/2 S
μ -0.20 *3*
Shell model predicts even parity but μ agrees with $p_{1/2}$ Schmidt limit

K.H.Lindenberger, A.Steudel, Naturwiss. 42, 41 (1955).

Tm^{170}
69 101
127^d

Tm^{169}(pile n,γ) chem
γ 2.6% 0.0841 *3* $\alpha_K = 1.6$ cryst
x 3.7% K x ray 4π pc
No ϵ_K (<0.2%) (Er K x ray <0.2%)

H.Jaffe, UCRL-2537 (1954).

$_{70}$Yb

Resonances Yb(n) $E_n = 0.07$ to 20 ev

E_0 (ev)	$\sigma_0\Gamma^{2**}$	cryst
0.597 *1**	1.28 ± 0.10	
4.551 *3*	<1	
8.09 *8*	1-10	
13.30 *14*	1-10	
18.2 *2*	1-10	

*Assigned to A = 169 **For natural Yb

V.L.Sailor, H.H.Landon, H.L.Foote, Jr., Phys. Rev. 96, 1014 (1954); 89, 904A (1953).

Yb^{166}
70 96
54^h

τ 53.8^h Ta^{181}(340-Mev p) chem
p 7.7^{h}Tm chem
γ 0.112* scin
0.140*
*Possibly in 7.7^{h}Tm

W.E.Nervik, G.T.Seaborg, Phys. Rev. 97, 1092 (1955).

Yb$^{167?}$
70 97
74^m

τ 74^m Ta^{181}(340-Mev p) chem
β^+ 2.4 *2* s

W.E.Nervik, G.T.Seaborg, Phys. Rev. 97, 1092 (1955).

Yb^{169}
70 99
31.8^d

Resonance Yb$^{(168)}$(n) $E_n = 0.07$ to 20 ev

E_0 (ev)	$\sigma_0\Gamma^2$	cryst
0.597 *1*	995 ± 90	

See also Yb

V.L.Sailor, H.H.Landon, H.L.Foote, Jr., Phys. Rev. 96, 1014 (1954); 89, 904A (1953).

Yb^{175}
70 105
4.2^d

Yb$^{(174)}$(th n,γ)

β^-	7%	0.072		scin/β-γ,sl
	3%	0.355		
	90%	0.468		
γ		0.1136	M1 + E2	sl ce,scin
		0.1376		
		0.144		
		0.251		
		0.2824	E1 + M2	
		0.3960	M2 + (E1?)	

(0.072 β)(0.396 γ) (0.355 β)(0.113 γ)
(0.113 γ)(0.282 γ) (0.144 γ)(0.251 γ)

J.P.Mize, M.E.Bunker, J.W.Starner, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), YA3(1955); verbal report.

$_{71}$Lu Resonances Lu(n) $E_n = 0.07$ to ~21 ev

cryst

E_o (ev)	$\sigma_o\Gamma^{2*}$	Isotope
0.142 *1*	1.4 ±0.3	177
1.57 *1*	<1	177
2.62 *2*	1-10	177
4.80 *4*	1-10	177 ?
5.30 *5*	10-50	176
11.4 *2*	10-50	176
14.4 *3*		176
20.6 *5*		176 ?

*For natural Lu

V.L.Sailor, H.H.Landon, H.L.Foote, Jr., Phys. Rev. 96, 1014 (1954); 92, 656 (1953); 90, 362A (1953).

Lu^{176} 71 105 2.4×10^{10}y Resonances Lu$^{(175)}$(n) $E_n = 0.07$ to ~21 ev

cryst

E_o (ev)	$\sigma_o\Gamma^2$
5.30 *5*	10-50
11.4 *2*	10-50
14.4 *3*	
20.6* *5*	

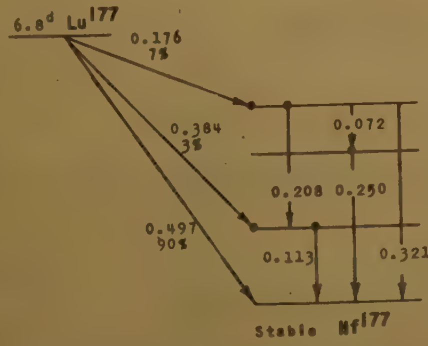
*Assignment uncertain

V.L.Sailor, H.H.Landon, H.L.Foote, Jr., Phys. Rev. 96, 1014 (1954); 92, 656 (1953); 90, 362A (1953).

Lu^{177} 71 106 6.8^d Lu$^{(176)}$(pile n,γ)

β^-	7%	0.176		sl $\beta\gamma$
	3%	0.384		sl $\beta\gamma$
	90%	0.497 *2*		sl
γ	2†	0.07164 *2*	$\alpha\sim0$	E1 cryst
	100†	0.11297 *2*	$\alpha_K = 0.75$	E2
			$\alpha_{L_1} = 0.12$; $\alpha_{L_2} = 0.70$; $\alpha_{L_3} = 0.58$	
	220†	0.20836 *2*	$\alpha_K = 0.044$	
			$\alpha_{L_1} = 0.007$	E1
	3†	0.2500 *5*	$\alpha_K = 0.3$ $\alpha_{L_1} = 0.1$	
	3†	0.3213 *1*	$\alpha_K = 0.2$	

(0.072γ)(0.250γ)



P.Marmier, F.Boehm, Phys. Rev. 97, 103(1955).

Lu^{177} 71 106 6.8^d Resonances Lu$^{(176)}$(n) $E_n = 0.07$ to ~21 ev

cryst

E_o (ev)	$\sigma_o\Gamma^2$
0.142 *1*	54 ± 12
1.57 *1*	10-50
2.62 *2*	>100
4.80* *4*	>100

*Assignment uncertain

V.L.Sailor, H.H.Landon, H.L.Foote, Jr., Phys. Rev. 96, 1014 (1954); 92, 656 (1953); 90, 362A (1953).

Hf^{175} 72 103 70^d γ sl ce, scin

0.0893
0.1136
0.2293
0.3186
0.3429
0.4322

(0.089γ)(0.343γ)

J.P.Mize, M.E.Bunker, J.W.Starner, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), YA3(1955); verbal report.

Hf^{176} 72 104 stable Level Hf^{176}($\alpha,\alpha'\gamma$) $E_\alpha = 5.7$

γ 0.087 *3* $\epsilon B(E2) = 0.56$ scin

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), X6; verbal report.

Hf^{177} 72 105 stable Levels Hf^{177}($\alpha,\alpha'\gamma$) $E_\alpha = 5.7$

γ 0.113 *2* $\epsilon B(E2) = 0.77$ scin
0.250 *5* $= 0.47$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), X6; verbal report.

Hf^{178} 72 106 stable Level Hf^{178}($\alpha,\alpha'\gamma$) $E_\alpha = 5.7$

γ (0.090) $\epsilon B(E2) = 0.85$ scin

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 98, (1955).
BAPS 30, #1 (New York), X6; verbal report.

Hf^{179} 72 107 stable Levels Hf^{179}($\alpha,\alpha'\gamma$) $E_\alpha = 5.7$

γ 0.119 *2* $\epsilon B(E2) = 0.67$ scin
0.260 *5* $= 0.05$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 98, (1955).
BAPS 30, #1 (New York), X6; verbal report.

Hf^{180}
72 108
stable

Level $Hf^{180}(\alpha,\alpha'\gamma)$ $E_\alpha = 5.7$
γ (0.093) $\epsilon B(E2) = 0.78$ scin

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), X6; verbal report.

Ta
73

Abundances ms
Ta^{180} 0.0123%
Ta^{181} 99.988%
No Ta^{177}, Ta^{178}, Ta^{179} (< 0.0003%)
No Ta^{182}, Ta^{183} (< 0.0002%)

F.A.White, T.L.Collins, Jr., F.M.Rourke, Phys. Rev. 97, 566 (1955).

Ta^{181}
73 108
stable

Level $Ta^{181}(\alpha,\alpha'\gamma)$ $E_\alpha = 3.65$
γ 0.137 K/L~6 $s\pi$ ce
93% M1, 7% E2

E.M.Bernstein, H.W.Lewis, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), CA7(1955); verbal report.

γ $Ta^{181}(n,?\gamma)$ $E_n = 3.2$ scin
1.26† 0.46
0.93† 1.4
†σ in barns

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

Resonance $Ta^{(180)}(n)$ $E_n = 0.35$ to 0.58 ev
0.433 ev $\sigma_o = 12{,}900^*$ cryst
$\Gamma = 0.030$

*Using 0.0123% for abundance

J.E.Evans, E.G.Jokl, R.R.Smith, Phys. Rev. 97, 565 (1955).

Ta^{182}
73 109
111^d

τ 115.5^d

γ sd ce,pe

0.0657 *2*			
0.0677 *2*		0.9295 *10*	
0.0847 *3*		0.9594 *18*	
0.1001 *3*		1.0015 *18*	
0.1098 *5*		1.0459 *10*	
0.1135 *2*	100*	1.1220 *10*	
0.1162 *5*		1.1591 *10*	
0.1516 *10*	80*	1.1893 *18*	
0.1794 *10*	80*	1.2220 *10*	
0.1976 *10*	9*	1.2303 *12*	
0.2221 *5*	5*	1.2575 *20*	
0.2290 *5*	2*	1.2745 *10*	
0.2638 *10*	10*	1.2894 *20*	
0.2962 *10*		1.3310 *20*	
0.3295 *10*		1.3725 *20*	
0.3352 *8*		1.4536 *11*	
0.8934 *13*		1.6085 *15*	

*Relative intensity ce_K

C.M.Fowler, N.W.Kruse, V.Keshishian, R.J.Klotz, G.P.Mellor, Phys. Rev. 94, 1082 (1954); priv. comm.

Ta^{182}
73 109
111^d

β^- 0.51 *1* Ta^{181}(pile n,γ); sl
Evidence for at least 2 lower energy β's
sl ce, cryst

γ			α_K	α_{L_1}	α_{L_2}	α_{L_3}
(E1)	w	0.03336				
(E1)	w	0.04271				
M1	8†	0.06571*		2.8	0.4	0.23
E1	85†	0.06774*		0.17	0.07	0.07
M1	5†	0.08467*		1.8	0.6	0.5
E2	40†	0.10009*	1.5	0.13	1.45	1.35
M1	8†	0.11366	1.7	0.4	0.07	
	1.7†	0.11640				
E1	35†	0.15241	0.07			
(E1)	12†	0.15637	small			
	16†	0.17936	0.41	0.17		0.05
E2	7.5†	0.19831	0.24		0.11	0.07
E1	35†	0.22205	0.06	0.01		
E2	20†	0.22927	0.16		0.05	0.03
E2	22†	0.26409	0.11		0.04	0.02
(E3)		0.927				
(E3)		0.960		K/L		
(M1 + E2)		1.003		7.0		
M1 + E2	100†	1.122	0.005	6.7		M1 + E2
(M2)	6.5†	1.155	0.004			
M2 + E3	45†	1.189	0.006	6.5		
E2	95†	1.222	0.003	6.0		
E2	50†	1.231	0.003			
(M2)		1.289		6.6		
(E3)		1.375				
		1.437				
(M2 + E3)		1.454				

*M and N conversion data given
Decay scheme proposed
α's based on α_K(Ta^{183} 0.24605 γ) = 0.38

J.J.Murray, F.Boehm, P.Marmier, J.W.M.DuMond, Phys. Rev. 97, 1007 (1955); 95, 864 (1954).

Resonances $Ta^{181}(n)$ $E_n \leq 130$ ev
E_o (ev) chopper
10.38 $\Gamma = 0.053$ ev $\Gamma_\gamma = 0.049$ ev
20 resonances observed up to 130 ev
10 resonances up to 40 ev give $\bar{D} = 9$ ev

V.E.Pilcher, D.J.Hughes, J.A.Harvey, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), 88 (1955); verbal report.

Resonances $Ta^{181}(n)$ $E_n = 13$ to 147 ev
E_o (ev)
22.9 chopper, cryst
35
36

F.B.Simpson, R.G.Fluharty, O.D.Simpson, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), 85 (1955); verbal report.

Ta^{183}
73 110
5^d

τ 5.2^d Ta^{181}(pile n)
β^- >95% 0.615 *10* sl
<5% <1.0
sl ce, cryst

γ			α_K	α_{L_1}	α_{L_2}	α_{L_3}
M1	22†	0.04097		11.5		0.8
M1	220†	0.04648*		7.4	1.05	0.5
M1	240†	0.05259*		3.8	0.9	0.55

(CONTINUED)

Ta^{183}
73 110
5^{d}

γ			α_K	α_{L_1}	α_{L_2}	α_{L_3}
KM1)	11†	0.08292		1.4		
M1	70†	0.08470*		1.1		
E2	220†	0.09907*	1.4		1.55	1.45
M1	9.5†	0.10194	5.4			
M2	4†	**0.10249	3.5	6.0		
(E2)	3†	0.10314				
M1	350†	0.10793*	3.8	0.6		
(M1)	17†	0.10973				
M1	3†	0.12038	2.1			
M1	15†	**0.14225		0.35		
M1	85†	0.14412*	1.65	0.30		
E2	105†	0.16053	0.4			
M1	310†	0.16136	1.15			
M1	165†	0.16233	1.10			
M1	9†	0.19264	0.65			
M1	9†	0.20327	0.65			
M1	35†	0.20506	0.6	0.13		
M1	26†	0.20881	0.7			
E2	165†	0.20987	0.22		0.065	0.03
E2	340†	0.24426	0.15			
M1	1000†	0.24605	(0.38)	0.07		
E2	200†	0.29171	0.07		0.023	
M1	300†	0.31303	0.22	0.035		
M1	400†	0.3540	0.14	0.025		
(M1)	35†	0.3656				
(E2)	40†	0.4066				

*M and N conversion data given
**Not assigned in proposed decay scheme
α's based on $\alpha_K(0.24605\,\gamma) = 0.38$

J.J.Murray, F.Boehm, P.Marmier, J.W.M.DuMond, Phys. Rev. 97, 1007 (1955); 92, 202; 96, 858A (1954).

W
74

Abundances

W^{185}	< 0.0002%	MS
W^{187}	< 0.0001%	

F.A.White, T.L.Collins, F.M.Rourke, Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), N4.

		W(n,n'γ)	$E_n = 4.4$
γ	59†	0.64 *2*	
	100†	0.77 *2*	

R.M.Sinclair, Phys. Rev. 99(1955); BAPS 30, #3(Washington), F7(1955); verbal report.

W^{182}
74 108
stable

Level W$^{(182)}(\alpha,\alpha'\gamma)$ $E_\alpha = 2.75$
γ 0.106 K/L < 1 E2 sπ ce

E.M.Bernstein, H.W.Lewis, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), CA7(1955); verbal report.

W^{184}
74 110
stable

Level W$^{(184)}(\alpha,\alpha'\gamma)$ $E_\alpha = 2.75$
γ 0.116 K/L < 1 E2 sπ ce

E.M.Bernstein, H.W.Lewis, Phys. Rev. 99(1955); BAPS 30, #3(Washington), CA7(1955); verbal report.

W^{186}
74 112
stable

Level W$^{(186)}(\alpha,\alpha'\gamma)$ $E_\alpha = 2.75$
γ 0.126 K/L < 1 E2* sπ ce

E.M.Bernstein, H.W.Lewis, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), CA7(1955); *verbal report.

Re
75

Resonances Re(n) $E_n = 1$ to 14 ev

E_o (ev)	$\Gamma_\gamma (10^{-3}$ev)	σ_t	
2.157	48	13700	cryst
4.4	45		
~5.9			
~7.2			
~11.3			
11.9			

G.Igo, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), B2(1955); verbal report.

Re^{180}
75 105
2.4^{m}

τ	2.42^{m} *7*	W(31-Mev p)
β^+	1.1 *1*	a
γ	0.106 *10*	scin
	0.880 *40*	

V.K.Fischer, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), YA10 (1955).

Re^{185}
75 110
stable

J 5/2 Mic
$q(Re^{185})/q(Re^{187}) = 1.07 \pm 0.05$

A.Javan, A.Engelbrecht, Phys. Rev. 96, 649 (1954); 91, 222A (1953).

Re^{187}
75 112
?

τ > 10^{16}y PC
No β with $E_\beta > 0.001$
L x rays observed from Re, Os, Pt, W believed produced by background γ's

D.Dixon, A.McNair, Phil. Mag. 45, 1099(1954).

J 5/2 Mic
$q(Re^{185})/q(Re^{187}) = 1.07 \pm 0.05$

A.Javan, A.Engelbrecht, Phys. Rev. 96, 649 (1954); 91, 222A (1953).

Re^{188}
75 113
16.9^{h}

τ_2	16.7^{h} *5*	W$^{(186)}$(slow n)	chem
β^-	2.01		s

B.S.Dzhelepov, N.D.Novosil'tseva, P.A.Tishkin, Izvest. Akad. Nauk Ser. Fiz. SSSR 18, 76(1954).

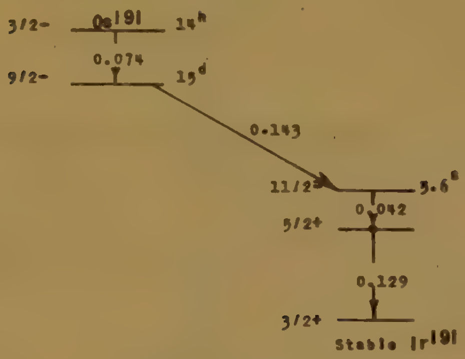
Os^{187}
76 111
stable

τ_ϵ $>10^{15y}$ pc
L x rays observed from Re, Os, Pt, W believed produced by background γ's

D.Dixon, A.McNair, Phil. Mag. 45, 1099 (1954).

Os^{191}
76 115
14^h

γ 0.0742 E4 1-2% M3~98%
$L_1 : L_2 : L_3 = 55 : 15 : 100$
No β^- (< 5%)



J.W.Mihelich, M.Goldhaber, Phys. Rev. 98 (1955).
BAPS 30, #1(New York), S1; verbal report.

Ir
77

Resonances Ir(n) $E_n = 0.1$ to 10 ev

E_o (ev)	$\Gamma_\gamma (10^{-3}ev)$	A*
0.654	74 ±5	192
1.305	87 ±3	194
5.36	65 ±5	?

*Assignment from activation

H.H.Landon, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), 81(1955); verbal report.

Ir^{191}
77 114
4.9^s

τ_1 4.91^s *14* Ir(31-Mev p)

V.K.Fischer, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), YA10(1955).

τ_1 5.6^s *4* d 15^dOs chem
γ (0.042)
(0.129)

R.A.Naumann, J.B.Gebhart, Phys. Rev. 96, 1452 (1954).

τ_1 6.8^s *1* Ir^{191}(fast n,n'γ)
γ (0.042)
(0.129) $\tau < 5x10^{-10s*}$ scin

J.W.Mihelich, M.McKeown, M.Goldhaber, Phys. Rev. 96, 1450(1954); *A.W.Sunyar, ibid.

Ir^{192}
77 115
1.42^m

τ_1 1.42^m $Ir^{(191)}$(pile n,γ)
γ 0.0580 *4* $L_2/L_3 = 1.1$ sm ce
$\alpha_L \gtrsim 870$ E3 scin
No $\gamma\gamma$ (< 1% of count expected for 2 quantum decay)
Continuum ≤ 50 kev attributed to bremsstrahlung (< 0.01 quantum/ce)

J.P.Mize, M.E.Bunker, J.W.Starner, Phys. Rev. 96, 444; 95, 627A (1954).

Ir^{192}
77 115
74.4^d

β^- 0.672 $Ir^{(191)}$(pile n,γ) sl

γ	2.6†	0.1362 *3*	57†	0.4678 *1*	sl pe
	0.8†	0.1740 *4*	5.2†	0.4844 *2*	
	0.8†	0.2012 *3*	6.4†	0.5887 *3*	
	3.5†	0.2054 *2*	10†	0.6045 *3*	
	1.0†	0.2815 *5*	7.7†	0.6127 *2*	
	28†	0.2958 *1*	0.06†	0.745 *3*	
	28†	0.3084 *1*	0.05†	0.783 *2*	
	77†	0.3165 *1*	0.9†	0.8854 *10*	
	0.5†	0.374 *2*	0.15†	1.065 *2*	
	0.5†	0.440 *2*	0.08†	1.157 *2*	

M.W.Johns, S.V.Nablo, Phys. Rev. 96,1599(1954)

γ	137†	0.31	(3 unresolved γ's)	scin
	49†	0.47	(2 unresolved γ's)	
	27†	0.60	(3 unresolved γ's)	
x	13†	K x ray		

†Photons per 100 β^-

H.Jaffe, UCRL-2537 (1954).

Ir^{194}
77 117
19^h

β^-	~8%	0.430	$Ir^{(193)}$(pile n,γ) sl
	9.7%	0.975	
	15%	1.905	
	66%	2.236 *10*	

γ	5.1†	0.2930 *3*	0.3†	1.339 *2*	sl pe
	27†	0.3281 *2*	0.8†	1.466 *1*	
	< 3†	0.466	0.2†	1.478 *1*	
	1.7†	0.6200 *10*	0.3†	1.507 *2*	
	6.2†	0.6433 *6*	0.3†	1.618 *2*	
	2.9†	0.9374 *4*	0.2†	1.662 *3*	
	2.9†	1.1492 *6*	0.3†	1.802 *2*	
	1.7†	1.180 *1*	0.05†	2.048 *4*	
	0.4†	1.216 *1*			

M.W.Johns, S.V.Nablo, Phys. Rev. 96, 1599 (1954).

Pt
78

Level Pt(p,p'γ) $E_p = 2.0$ to 4.0
γ 0.345 scin
Anisotropy in σ_γ (E_p) studied

W.I.Goldburg, Phys. Rev. 99(1955); BAPS 30,#3 (Washington), CA8(1955).

Pt^{193}
78 115
3.4^d

τ_1 3.5^d 4 source: 12^hHg
γ 0.1345 sm ce
$K:L_1:L_3:M = 1:2:4:1$
d 3.8^sAu 0.03%

J.Brunner, H.Guhl, J.Halter, O.Huber, Helv. Phys. Acta 28, 85 (1955).

Pt^{196}
78 118
stable

Resonances Pt^{195}(n) chopper

E_o (ev)	Γ(ev)
11.9	0.17
19.5	0.12
68.0	
120	
153	

A.Stolovy, J.A.Harvey, Phys. Rev. 99(1955); BAPS 30, #3(Washington), B9(1955); priv.comm.

Pt^{197}
78 119
18^h

β^- 0.468 scin $\beta\gamma$
0.479
0.670
γ 30+ 0.077 scin
3.9+ 0.191
1.0+ 0.279
(0.077 γ)(0.191 γ)

V.R.Potnis, C.E.Mandeville, J.S.Burlew, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), VA6 (1955); verbal report.

$Pt^{199?}$
78 121
29^m

Resonance $Pt^{(198?)}$(n) chopper
E_o (ev)
96.0

A.Stolovy, J.A.Harvey, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), B9(1955); priv. comm.

Au^{192}
79 113
4.8^h

τ 4.8^h Au^{197}(p) Hg(p) chem
γ s ce

0.1365	0.401
0.1577	0.4155
0.1734	0.4355
0.2054	0.467
0.2818	0.588
0.2957	0.612
0.3081	0.783
0.3160	1.158

G.T.Ewan, A.L.Thompson, Proc. Roy. Soc. Canada 47, 126A (1953); and quoted by M.W.Johns, S.V.Nablo, Phys. Rev. 96, 1599 (1954).

Au^{193}
79 114
3.9^s

τ_1 3.9^s 3 Pt(31-Mev p)
γ 0.26 2 $\alpha_K = 0.4^*$ a, scin

V.K.Fischer, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), YA10(1955); *verbal report.

Au^{193}
79 114
3.9^s

τ_1 3.8^s 3 source: 12^hHg

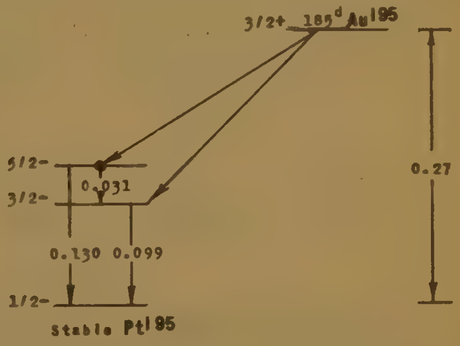
γ	99.5%	0.0324	E3	sl ce
	99.5%	0.2573	M1(+E2)	
	0.5%	0.2898	M4	

(ce 0.032 γ)(0.257 γ) sl
p 3.4^dPt 0.03%

J.Brunner, H.Guhl, J.Halter, O.Huber, Helv. Phys. Acta 28, 85 (1955).

Au^{195}
79 116
185^d

$Pt^{(196)}$(28-Mev d,3n) chem
γ 1.4+ (0.031) $\alpha = 32$ M1 pc
14+ (0.099)
x 41+ L x ray
100+ K x ray
(L x ray)(L x ray, 0.031 γ)
ϵ_L/ϵ_K (to 0.130 level) = 0.58 ± 0.14
$E_{dis} = 0.14 + 0.13$ (E_γ)
Data indicate little if any ϵ to Pt^{195} g.s.



A.Bisi, L.Zappa, Nuovo Cim. 12, 539 (1954).

Au^{197}
79 118
stable

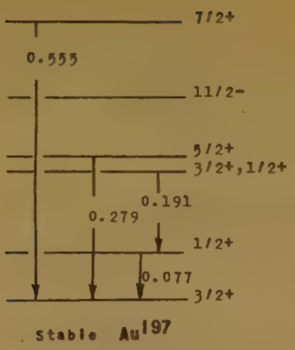
Levels Au^{197}(p,p'γ) $E_p = 3.50$
Au^{197}($\alpha,\alpha'\gamma$) $E_\alpha = 2.3$ to 3.5
γ 0.077 sm ce
0.191
0.279 K/L = 5.7
64% M1, 36% E2
Direct excitation of 0.077 level established

E.M.Bernstein, H.W.Lewis, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), CA7(1955); verbal report.

Levels Au^{197}(p,p'γ) $E_p = 2.0$ to 5.0
0.279 Level J = 5/2+ p,$\gamma(\theta)$
γ 0.279 E2/M1 ~ 0.7
0.555 Level J = 7/2+ p,$\gamma(\theta)$
γ 0.555
No 0.276 γ (< 5% of 0.555 γ) from no(0.279γ)γ
No 0.478 γ

(CONTINUED)

Au^{197}
79 118
stable



C.F.Cook, C.M.Class, J.T.Eisinger, Phys. Rev. 94, 744, 747A; 95, 628A; 96, 658 (1954).

Au^{198}
79 119
2.70^d

J 2 M
μ probably positive*

J.B.Reynolds, R.L.Christensen, D.R.Hamilton, A.Lemonick, F.M.Pipkin, H.H.Stroke, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), BA7 (1955); *verbal report.

Resonance Au^{197}(n) E_n = 1 to 14 ev
(4.94 ev) $\sigma_s \Gamma^2$ = 75.4 cryst
σ_s/σ_t = 0.106

H.L.Foote, Jr., J.Moore, Phys. Rev. 98 (1955). BAPS 30, #1(New York), HA1.

Au^{199}
79 120
3.16^d

J 3/2 M

J.B.Reynolds, R.L.Christensen, D.R.Hamilton, A.Lemonick, F.M.Pipkin, H.H.Stroke, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), BA7(1955).

$_{80}Hg$

γ Hg(n,?γ) E_n = 3.2 scin
st 0.38 1.21
0.54 2.0
0.90

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

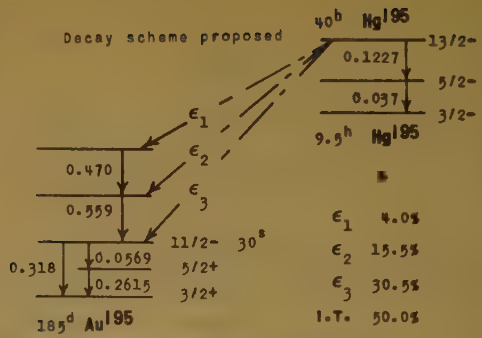
Hg^{193}
80 113

source 12^hHg
γ 0.570 sl ce
0.860
0.920

J.Brunner, H.Ghul, J.Halter, O.Huber, Helv. Phys. Acta 28, 85 (1955).

Hg^{195}
80 115
40^h

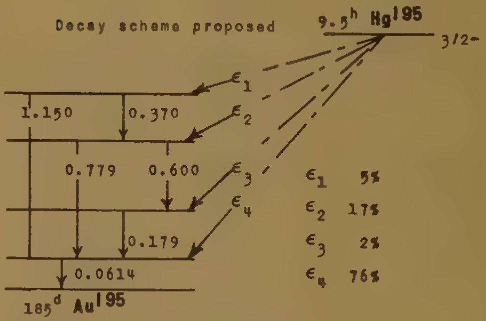
Decay scheme proposed



Supporting coincidence data not given

Hg^{195}
80 115
9.5^h

Decay scheme proposed



Supporting coincidence data not given

J.Brunner, J.Halter, O.Huber, R.Joly, D.Maeder, Helv. Phys. Acta 27, 512A, 572 (1954).

Hg^{197}
80 117
23^h

(ce 0.165 γ)(0.134 γ) delay 8×10^{-9} s
($ce_{K,L,M}$ 0.165 γ)(0.134 γ)(θ) suggests 0.134 γ is E2 and 0.165 γ is M4 + E5 sl ce, scin

H.H.Coburn, S.Frankel, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), YA7(1955); verbal report.

Hg^{197}
80 117
65^h

J 1/2 Au^{197}(15-Mev d,2n) chem
μ 0.52 *1* 8
$\mu(65^h Hg^{197})/\mu(Hg^{199})$ = 1.033 ± 0.016

F.Bitter, S.P.Davis, B.Richter, J.E.R.Young, Phys. Rev. 96, 1531 (1954).

Hg^{198}
80 118
stable

Level $Hg^{(198)}$(γ,γ) Au^{198} at 1125°C
(0.411) J = 2 $\gamma\gamma(\theta)$

F.R.Metzger, Phys. Rev. 97, 1258 (1955).

Hg^{199}
80 119
44^m

τ_1 42^m *1* Hg(fast n)
γ 0.159 α_K = 0.34 scin
0.368 $\alpha_K \sim 1$
(x ray)(0.159 γ, 0.368 γ)
(0.159 γ)(0.368 γ)(θ) $\eta(\pi) < 0$

H.H.Bolotin, R.G.Wilkinson, Phys. Rev. 99 (1955); BAPS 30, #3 (Washington), YA8(1955); verbal report.

Hg^{203}
80 123
47^d

γ (0.280) $a_K = 0.147$ $s\pi$, scin
$a_L = 0.045$ $\beta(ce)/\beta$
a_K, a_L gives E2/M1 = 3.0 x/γ

R.K.Doerner, A.H.Weber, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), YA11(1955).

Tl^{196}
81 115
$\sim 4^h$

τ $\sim 4^h$ Tl(190-Mev p) chem
ϵ
γ 0.426 sd ce

G.Andersson, E.Arbman, I.Bergström, A.H.Wapstra, Phil. Mag. 46, 70 (1955).

Tl^{197}
81 116
2.8^h

τ_2 2.8^h 4 Tl(190-Mev p) chem; ms
E

γ	> 3*	0.134	K/L ≥ 0.1	$L_1L_2/L_3 = 1.4$
	> 100*	0.152	K/L > 2.5	No L_3
	> 5*	0.174	K/L ~ 5	No L_3
	5*	0.269?		
	7*	0.434	K/L ~ 6	
	6*	0.583?		
	1*	0.588?		
	4*	0.611		
	3*	0.637?		

Energy range observed 0.05 to 0.70
*Relative intensity ce_K

G.Andersson, E.Arbman, I.Bergström, A.H.Wapstra, Phil. Mag. 46, 70 (1955).

Tl^{200}
81 119
27^h

γ	5*	0.1163		sd ce
	4*	0.2521		
	2*	0.2891	?	
	100*	0.3676	K/L = 2.0	
	7*	0.5788	K/L = 4	
	1*	0.6284	?	
	1*	0.6602	?	
	1*	0.7884	K/L = 5	
	8*	0.828	K/L = 4	
	9*	1.205	K/L = 4.3	
	1*	1.224		
	1*	1.363		
	1*	1.515	*Relative intensity ce_k	

K.E.Bergkvist, I.Bergström, C.J.Herrlander, S.Hultberg, H.Slätis, E.Sokolowski, A.H.Wapstra, T.Wiedling, Phil. Mag. 46, 65, (1955).

Tl^{201}
81 120
3^d

			L_1/L_2	K/L	sd ce
γ		0.0306	10		M1
		0.0321	10		M1
	60*	0.1350	10	7.0	M1
	100*	0.1672	10	6.2	M1

(0.135 γ)(ce 0.030 γ, ce 0.032 γ) sl
No (0.167 γ)(ce 0.030 γ, ce 0.032 γ) sl
No (0.135 γ)(0.167 γ) No 0.1657 γ
(0.030 γ)/(0.032 γ) = 1.0
(0.167 γ)/(0.135 γ) = 3.2
*Relative intensity ce_K d 9.4^hPb

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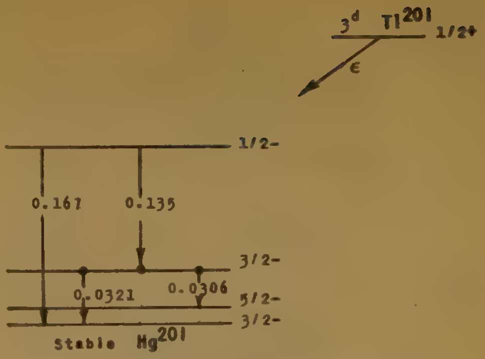
Tl^{201}
81 120
3^d



K.E.Bergkvist, I.Bergström, C.J.Herrlander, S.Hultberg, H.Slätis, E.Sokolowski, A.H.Wapstra, T.Wiedling, Phil. Mag. 46, 65 (1955).

Tl^{202}
81 121
12^d

d $\sim 3\times10^{5y}$Pb chem
$\epsilon_K/\epsilon_L \sim 2.3$ from K x ray/ L x ray = 2.6 scin

J.R.Huizenga, C.H.Stevens, Phys. Rev. 96, 548 (1954).

Tl^{203}
81 122
stable

$Tl^{(203)}(p,p'\gamma)$ $E_p = 4.0$
γ 0.279 $\tau_\gamma(E2) = 3.3\times10^{-10}s$ scin
0.410 $= 1.1\times10^{-12}s$
(0.279 γ)(0.410 γ)

P.H.Stelson, F.K.McGowan, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), CA5(1955); verbal report.

Tl^{204}
81 123
4.1^y

β^- 0.762 5 sl
Includes correction of −0.003 for 3% resolution

L.Feuvrais, T.Yuasa, Compt. rend. 239, 1627 (1954).

ϵ_K 1.8% 4π pc, scin
ϵ_L 0.6%
Hg K_α x ray cryst

H.Jaffe, UCRL-2537 (1954).

Resonance $Tl^{203}(n)$ chopper

E_o(ev)	Γ(ev)	J
238	~5	1

A.Stolovy, J.A.Harvey, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), B9(1955); priv. comm.

Tl^{205}
81 124
stable

γ $Tl^{(205)}(p,p'\gamma)$ $E_p = 4.0$
0.205 $\tau_\gamma(E2) = 2.5\times10^{-10}s$* scin
0.410
~0.60*
(0.205 γ)(0.410 γ)

P.H.Stelson, F.K.McGowan, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), CA5(1955); *verbal report.

Tl^{208}
81 127
3.1^m

γ	0.252	s ce
	0.763	scin, s ce

Both γ's coincident with 2.62 γ and are probably from new level at 3.961

L.G.Elliott, R.L.Graham. J.Walker, J.C.Wolfson, Proc. Roy. Soc. Canada 48, 12A (1954).

Pb
82

γ		Pb(n,n'γ)		$E_n = 3.2$	scin
	0.52†	0.35	0.18†	1.10	
	1.02†	0.52	0.25†	1.4	
	1.05†	0.80	0.16†	2.2	

†σ in barns

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

Pb^{197}
82 115
42^m

τ		42^m *3*	Tl(190-Mev p)	chem	ms
ϵ					
γ	> 13*	0.169**			sd ce
	100*	0.223	$K/L \geq 0.4$	$L_1L_2/L_3 = 2.3$	
	67*	0.234**	$K/L \sim 0.3$	$L_1L_2/L_3 = 2.0$	
	13*	0.323?			
	85*	0.386	$K/L \sim 5$	No L_3	
	59*	0.388	$K/L \sim 5$	No L_3	

Energy range observed 0.05 to 0.70
*Relative intensity ce_K
**Possibly converted in Pb

G.Andersson, E.Arbman, I.Bergström, A.H.Wapstra, Phil. Mag. 46, 70 (1955).

Pb^{198}
82 116
2.3^h

τ		2.3^h *2*	Tl(190-Mev p)	chem	ms
ϵ					
γ	> 60*	0.173	$K/L \geq 0.5$	$L_1L_2/L_3 = 1.9$	
	5*	0.276?			
	100*	0.291		No L_3	
		0.330?			
	100*	0.365			
	17*	0.383			
	10*	0.398?			
	8*	0.420?			

No 25^m activity observed
Energy range observed 0.05 to 0.70 sd ce
*Relative intensity ce_K

G.Andersson, E.Arbman, I.Bergström, A.H.Wapstra, Phil. Mag. 46, 70 (1955).

Pb^{199}
82 117
12^m

τ_1	12.2^m *3*	Tl(190-Mev p)		chem	ms
γ	0.423	$K/L = 1.9$	M4?		sd ce

Photon not detected γ converted in Pb

G.Andersson, E.Arbman, I.Bergström, A.H.Wapstra, Phil. Mag. 46, 70 (1955).

Pb^{199}
82 117
90^m

τ_2		90^m *10*	Tl(190-Mev p)	chem	ms
ϵ					
γ	43*	0.354	$K/L \sim 5$	No L_3	sd ce
	100*	0.367	$K/L \sim 5$	No L_3	
	3*	0.722?			

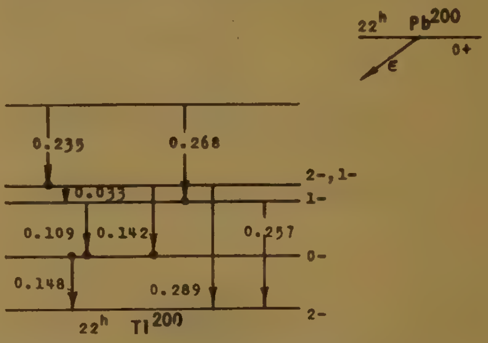
*Relative intensity ce_K

G.Andersson, E.Arbman, I.Bergström, A.H.Wapstra, Phil. Mag. 46, 70 (1955).

Pb^{200}
82 118
22^h

τ		21.5^h *4*	Tl(190-Mev p)	chem	
γ		0.0328	ce_M, ce_N only		sd ce
	3*	0.1095	K/L	No L_3	M1
	43*	0.1422	4.5	No L_3	M1
	100*	0.1480	0.4	$L_1L_2/L_3 = 1.9$	E2
	4*	0.1589			
	22*	0.2353	5.5	No L_3	M1
	7*	0.2573	4.5	No L_3	M1
	14*	0.2680	4.5	No L_3	M1
	1*	0.2895			
		0.450			

*Relative intensity ce_K
(ce 0.148 γ)(ce 0.109, 0.142, 0.235, 0.268 γ)**
No(ce 0.148 γ)(ce 0.159, 0.257, 0.289 γ)**



K.E.Bergkvist, I.Bergström, C.J.Herrlander, S.Hultberg, H.Slätis, E.Sokolowski, A.H.Wapstra, T.Wiedling, Phil. Mag. 46, 65 (1955); **T.R.Gerholm, ibid.

Pb^{201}
82 119
60^s

τ_1	60^S		Tl(31-Mev p)	
γ	0.65 *3*	$\alpha_K \sim 0.8$*		a, scin

V.K.Fischer, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), YA10(1955); *verbal report.

Pb^{201}
82 119
9.4^h

τ_2	9.4^h *2*		Tl(190-Mev p)		chem
γ(Tl)	0.1291	K/L			K/L
0.7*	0.2844?		0.6*	0.692	6.5
0.5*	0.3100	0.7?	0.3*	0.708?	
100*	0.3303	4.7	1.0*	0.766	5.5
25*	0.3612	5.6	0.4*	0.825?	
0.6*	0.3943	2.5	1.3*	0.907	5.5
2.7*	0.4056	2.8	1.6*	0.946	6.5
1.9*	0.585	5.5	0.2*	1.099	5.5

(ce 0.330 γ)(ce 0.361 γ)** sl
*Relative intensity ce_K

K.E.Bergkvist, I.Bergström, C.J.Herrlander, S.Hultberg, H.Slätis, E.Sokolowski, A.H.Wapstra, T.Wiedling, Phil. Mag. 46, 65 (1955); **T.R.Gerholm, ibid.

Pb^{202}
82 120
3.5^{h}

			α_K	K/L	sd ce
$\gamma(Pb)$	2*	0.1294		< 0.003	E4
				$L_2/L_3 = 1.7$	
	35*	0.4219	0.035	2.5	E2
	3.5*	0.6576	0.006	7.5	E1
	100*	0.7869	0.080	1.35	E5
	12*	0.9612	0.006	5.9	E2
$\epsilon \sim 10\%$					
$\gamma(Tl)$	27*	0.3892	0.16		M1+E2
	5*	0.4013	0.030		E2
	14*	0.4599		1.5	E3

*Relative intensity ce_K

K.E.Bergkvist, I.Bergström, C.J.Herrlander, S.Hultberg, H.Slätis, E.Sokolowski, A.H.Wapstra, T.Wiedling, Phil. Mag. 46, 65 (1955).

Pb^{202}
82 120
$\sim 3x10^{5y}$

τ_2 $\sim 3x10^{5y}$ D 12^{d}Tl chem

$Tl^{(203)}$(21-Mev d,3n)chem, ms

Assumed σ(21-Mev d,3n) = 0.5

(Tl^{202} L x ray)/(Pb^{202} L x ray) = 1.6 implies

$\epsilon_m \sim 40\%$ for Pb^{202}

No K x ray (< 0.5% of Tl^{202} K x ray) scin

J.R.Huizenga, C.M.Stevens, Phys. Rev. 96,548 (1954).

$Pb^{203?}$
82 121
6.7^{s}

τ_1 $\sim 10^{s}$ d 12^{h}Bi chem

γ $\sim 0.5?$ scin

0.9

I.Bergström, A.H.Wapstra, Phil. Mag. 46, 61 (1955).

τ_1 6.7^{s} *4* Tl(15-Mev p)

γ 0.86 *4* $\alpha_K \sim 0.1$* a, scin

V.K.Fischer, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), YA10(1955); *verbal report.

Pb^{204}
82 122
68^{m}

γ	12*	0.8993	E2	sd ce
	100*	0.9130	(E5)	

*Relative intensity ce_K

K.E.Bergkvist, I.Bergström, C.J.Herrlander, S.Hultberg, H.Slätis, E.Sokolowski, A.H.Wapstra, T.Wiedling, Phil. Mag. 46, 65 (1955).

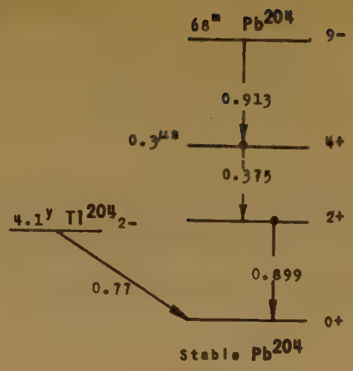
γ	(0.375)	E2	99.5%	M3	0.5%
	(0.899)	E2	100%		
	(0.913)	E2	99%	M6	1%

$$\left.\begin{array}{l}(0.913\gamma)(0.375\gamma)(\theta)\\(0.913\gamma)(0.899\gamma)(\theta)\end{array}\right\} J = 9,\ 4,\ 2,\ 0 \qquad \text{scin}$$

μ(1.274-Mev level) = 0.22 ± 0.02 $\gamma\gamma(\theta, H)$

(CONTINUED)

Pb^{204}
82 122
68^{m}



V.E.Krohn, S.Raboy, Phys. Rev. 97, 1017(1955).

Pb^{205}
82 123
?

τ_{ϵ_K} $> 6x10^{7y}$

τ_{ϵ_L} $\gg 3x10^{5y}$

$Tl^{(205)}$(21-Mev d,2n) chem, ms

J.R.Huizenga, C.M.Stevens, Phys. Rev. 96, 548 (1954).

Pb^{206}
82 124
stable

Level $Pb^{206}(p,p'\gamma)$ $E_p = 4.5$ scin

γ 0.803 $\tau_\gamma(E2) = 7.7x10^{-12s}$

P.H.Stelson, F.K.McGowan, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), CA5(1955); verbal report.

Pb^{207}
82 125
0.82^{s}

τ_1 0.799^{s} *13* $Pb^{(208)}$(≤22-Mev γ,n)

Indirect production of 0.82^{s}Pb suggested by large threshold (10.2 ± 0.3)

W.L.Bendel, M.E.Toms, R.A.Tobin, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), YA9(1955); verbal report.

τ_1 0.8^{s} *1* Pb^{208}(≤ 23-Mev γ,n)

γ 0.50 scin

1.01

Threshold of ~ 9-Mev inferred from activation ratios of Pb to Ag and Cu for $12 \le E_\gamma \le 23$

J.M.Reid, K.G.McNeill, Phil. Mag. 45, 957 (1954); Proc. Phys. Soc. 66A, 1179 (1953).

Pb^{207}
82 125
stable

Level $Pb^{(207)}(p,p'\gamma)$ $E_p = 4.5$

γ 0.570 $\tau_\gamma(E2) = 10x10^{-11s}$

P.H.Stelson, F.K.McGowan, Phys. Rev. 99(1955); BAPS 30, #3 (Washington), CA5(1955).

Pb^{208}
82 126
stable

Level $Pb^{(207)}(d,p)$ $E_d = 15.1$ scin

g.s. $l_n = 1$ d,p(θ)

N.S.Wall, Phys. Rev. 96, 670 (1954).

Bi^{207}
83 124
~50^{y}

			$x\gamma$*	Pb(25-Mev p) chem
γ	157†	0.57	10	scin
	100†	1.07	6	
	$\leq$1.0†	1.46	$\leq$1.5	
	10†	1.76	7	
	0.72†	2.47		

(0.57 γ)(1.07 γ, 1.46 γ, 1.76 γ)
No 2.05 γ, 2.20 γ, 2.35 γ (< 0.14†)
No (0.57 γ) $\gamma\gamma$ No 0.157 γ, 0.87 γ
*Percent of photons coincident with K x ray

J.R.Prescott, Proc. Phys. Soc. 67A, 540 (1954).

γ	100†	(0.570)		scin
		(0.890)		
		(1.064)		
	~0.1†*	(1.46)		
		1.77	E2,M1 or 25% E2,75% M3	

(1.77γ)(0.570γ)(θ) J = 7/2, 5/2, 1/2*
or J = 9/2, 5/2, 1/2*
(1.46γ)(0.89γ)*
No 2.46γ (< 0.25†)*
ϵ_L only to 2.34 level
ϵ_K ~3% to 0.57 level

M.H.Lazar, E.D.Klema, Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), S3; *verbal report.

Bi^{209}
83 126
stable?

γ		Bi^{209}(n,n'γ)	E_n = 3.2	scin
	0.43†	0.49		
	1.2 †	0.94		
	0.59†	1.62		
	0.39†	2.6 ?		

†σ in barns

V.E.Scherrer, B.A.Allison, W.R.Faust, Phys. Rev. 96, 386 (1954).

Bi^{210}
83 127
5.00^{d}

J 1 S

K.F.Smith, quoted by E.A.Plassmann, L.M.Langer Phys. Rev. 96, 1593 (1954).

β^- 1.155 5 sm
Spectrum shape can be fitted by S, T
interaction with ΔJ = 1, yes

E.A.Plassmann, L.M.Langer, Phys. Rev. 96, 1593 (1954).

β^- 1.17 sl
No γ (< 0.01%)
Spectrum shape can be fitted by S, T
interaction with ΔJ = 1, yes

L.Lidofsky, N.Benczer, P.Macklin, C.S.Wu, Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), S4.

Bi^{210}
83 127
2.6x10^{6y}

Level Bi^{209}(d,p) E_d = 15.1 scin
d,p(θ) for proton group with Q = 1.94 not in
agreement with simple theory for l_n = 2,4,6

N.S.Wall, Phys. Rev. 96, 670 (1954).

Bi^{212}
83 129
60.5^{m}

γ (0.040) α = 20* M1 $\alpha\gamma/\alpha$
(6.05 α)(0.040 γ)(θ) J = 1 or 2, 4, 5
*Using (6.05 α)/α = 0.70

J.W.Weale, Proc. Phys. Soc. 68A, 35 (1955).

(> 0.65γ)($\leq$1.50γ) scin
(> 0.80γ)($\leq$1.55γ)

F.Demichelis, Nuovo Cim. 12, 407 (1954).

Bi^{214}
83 131
19.7^{m}

(0.61γ)(1.12γ) most intense cascade scin
Weak $\gamma\gamma$ for both γ's with 1.5 > E_γ > 0.61
All other $\gamma\gamma$ include 0.61γ
No (0.61γ)(γ) for E_γ > 1.6
~ 65% of all γ's belong to a cascade

F.Demichelis, R.Malvano, Nuovo Cim. 12, 358 (1954).

Po$^{197?}$
84 113

τ	~4^{m}	Bi^{209}(170-Mev p)	chem
α	6.040		s

S.Rosenblum, H.Tyrén, Compt. rend. 239,1205 (1954).

Po$^{198?}$
84 114

τ	~6^{m}	Bi^{209}(170-Mev p)	chem
α	5.935		s

S.Rosenblum, H.Tyrén, Compt. rend. 239, 1205 (1954).

Po$^{199?}$
84 115

τ	~11^{m}	Bi^{209}(170-Mev p)	chem
α	5.846		s

S.Rosenblum, H.Tyrén, Compt. rend. 239, 1205 (1954).

Po$^{200?}$
84 116

τ	~8^{m}	Bi^{209}(170-Mev p)	chem
α	5.770		s

S.Rosenblum, H.Tyrén, Compt. rend. 239, 1205 (1954).

Po^{201}
84 117
18^{m}

τ	~17^{m}	Bi^{209}(170-Mev p)	chem
α	5.671		s

S.Rosenblum, H.Tyrén, Compt. rend. 239, 1205 (1954).

Po^{202}
84 118
56^{m}

τ	~55^{m}	Bi^{209}(170-Mev p)	chem
α	5.575		s

S.Rosenblum, H.Tyrén, Compt. rend. 239, 1205 (1954).

Po^{204} τ $\sim 3.8^{h}$ Bi^{209} (170-Mev D) chem
84 120 α 5.370 s
3.8^{h}

S.Rosenblum, H.Tyrén, Compt. rend. 239, 1205 (1954).

Po^{208} α $\sim 0.1\%$ 4.784 s
84 124 $\sim 100\%$ (5.109)
2.9^{y}

S.Rosenblum, H.Tyrén, Compt. rend. 239, 1205 (1954).

Po^{210} τ 138.4005^{d} *58* calorimeter
84 126 Five samples measured during 100-350 days
138.4^{d}

J.F.Eichelberger, K.C.Jordan, S.R.Orr, J.R.Parks, Phys. Rev. 96, 719 (1954).

$\gamma/\alpha = 1.21 \pm 0.06 \times 10^{-5}$ γ scin, α calorimeter

R.W.Hayward, D.D.Hoppes, W.B.Mann, J.Research, Nat. Bur. Standards 54, 47 (1955).

Po^{211} α 0.53% 6.569 d 7.5^{h}At; s
84 127 0.50% 6.895
0.52^{s} 99% (7.43)
No 6.34 α (<0.02%)

R.W.Hoff, UCRL-2325 (1953).

At^{210} α 0.063% 5.355 s
85 125 0.053% 5.437
8.3^{h} 0.054% 5.519
γ 199* 0.0446 sd ce
$L_{12} : L_{3} : M : N = 100 : 48 : 41 : 10$
33* 0.115 $K : L : MN = 100 : 17 : 14$
56* 0.243 $\alpha_{K} = 0.11$ E2
$K : L : MN = 100 : 83 : 25$
1.8* 1.189 $K : L = 100 : 21$
$\alpha_{K} = 4.8 \times 10^{-3}$ E2
0.21* $\left\{\begin{matrix} 1.458 \\ 1.504 \end{matrix}\right\}$ $\alpha_{K} = 1.2 \times 10^{-3}$ E1
No 0.511 γ (<5%) scin
*Relative intensity ce

R.W.Hoff, UCRL-2325 (1953).

At^{211} Bi^{209} (38-Mev α,2n) chem
85 126 α 5.862 s
7.5^{h} $\epsilon_{K}/\epsilon_{L} \sim 7$ from K x rays/L x rays = 3.1; scin, pc

R.W.Hoff, UCRL-2325 (1953).

Rn^{218} α 7.127 d 20.8^{d}U scin
86 132 γ 0.609 scin
0.019^{s}

F.Stephens, Jr., F.Asaro, I.Perlman, Phys. Rev. 96, 1568 (1954).

Ra^{222} α 6.554 d 20.8^{d}U scin
88 134 γ 0.330 scin
38^{s} (6.23 α)(0.330 γ)(θ) J = 0, 2, 0

F.Stephens, Jr., F.Asaro, I.Perlman, Phys. Rev. 96, 1568 (1954).

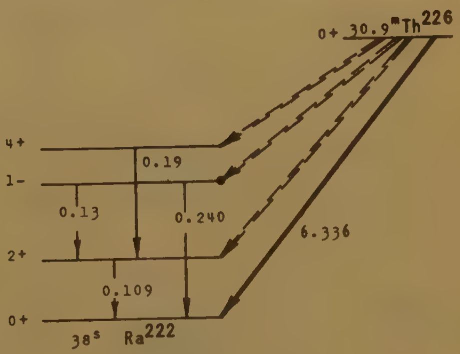
Ra^{223} τ 11.68^{d} *6* pc
88 135 Counted over period of 116 days
11.7^{d}

G.R.Hagee, M.L.Curtis, G.R.Grove, Phys. Rev. 96, 817A (1954).

Ac^{227} β^{-} 100% 0.0455 *10* 4π pc
89 138 F-K linear ($E_{\beta} > 0.007$)
22^{y} No 0.037 γ, no ce, no Th L x rays pc

W.Beckmann, E.Huster, Z.Naturf. 10a, 86 (1955).

Th^{226} α 6.336 d 20.8^{d}U; scin
90 136 γ 0.109 scin
30.9^{m} 0.13
0.19
0.240
(6.10 α)(0.240 γ)(θ) J = 0, 1, 0



F.Stephens, Jr., F.Asaro, I.Perlman, Phys. Rev. 96, 1568 (1954).

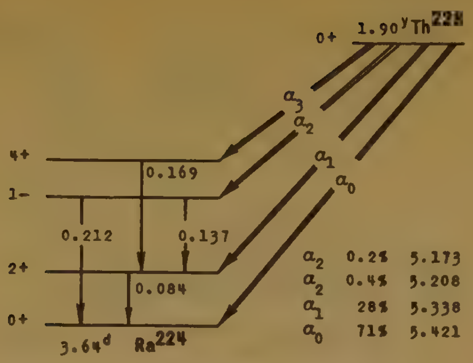
Th^{227} τ 18.17^{d} *8* pc
90 137 Counted over period of 116 days
18.2^{d}

G.R.Hagee, M.L.Curtis, G.R.Grove, Phys. Rev. 96, 817A (1954).

Th^{228} (5.21 α)(0.212 γ)(θ) J = 0, 1, 0
90 138 (5.34 α)(0.084 γ)(θ) J = 0, 2, 0
1.90^{y}

(CONTINUED)

Th^{228}
90 138
1.90^y



α_2	0.2%	5.173
α_2	0.4%	5.208
α_1	28%	5.338
α_0	71%	5.421

F.Stephens, Jr., F.Asaro, I.Perlman, Phys. Rev. 96, 1568 (1954); 92, 1495 (1953).

Th^{234}
90 144
24.1^d

β^-		~0.10		$\beta\gamma$ scin
γ	6.5%	0.029	$\alpha_L = 10^*$	scin
	6.5%	0.064	$\alpha_L = 0.25^*$	
	14.8%	0.093	$\alpha_L = 2.5^*$	

$(\sim 0.10\ \beta)(0.029\ \gamma,\ 0.064\ \gamma,\ 0.093\ \gamma)$
$(0.064\ \gamma)(0.029\ \gamma)$ No $(0.093\ \gamma)\gamma$
*Using ce data of Stoker et al.

S.A.E.Johansson, Phys. Rev. 96, 1075 (1954).

D 6.66^hPa 0.63 ± 0.06%
from $(1.18^m \text{Pa}\ \beta^-)/(6.66^h \text{Pa}\ \beta^-)$ GM

W.L.Zijp, Sj. Tom, G.J.Sizoo, Physica 20, 727 (1954).

Pa^{232}
91 141
1.3^d
Th^{232}(9-Mev p,n) chem
No ϵ_L (< 2%) (No Th L x ray) cryst

C.I.Browne, Jr., UCRL-1764 (1952).

Pa^{233}
91 142
27.4^d
Th^{232}(pile n) chem cryst

γ	5†	0.02867 *2*
	4†	0.04047 *10*
	110†	0.0754 *2*
	144†	0.0870 *3*

C.I.Browne, Jr., UCRL-1764 (1952).

Pa^{234}
91 143
1.18^m

β^-		~1.35			$\beta\gamma$ scin
γ	<0.19†	0.250	0.00†	(0.81)	scin
		0.33 ?	0.37†	1.00	
		0.38 ?	0.04†	1.81	
	0.12†	0.75			

$(\sim 1.35\ \beta)(1.00\ \gamma)$ $(\sim 0.6\ \beta)(1.81\ \gamma)$
$\beta(0.75\ \gamma)/\beta(1.00\ \gamma)$ not $f(E_\beta)$ for $E_\beta > 0.7$
†Photons per 100 Th^{234} disintegrations

S.A.E.Johansson, Phys. Rev. 96, 1075 (1954).

Pa^{234}
91 143
6.66^h
τ 6.658^h *12* d 24.1^dTh chem
Background of 24.1^dTh ~0.2%

W.L.Zijp, Sj. Tom, G.J.Sizoo, Physica 20, 727 (1954).

γ	<0.19†	0.250	Th^{234} chem scin
	0.06†	0.76	
	0.07†	0.91	
	0.02†	1.68	

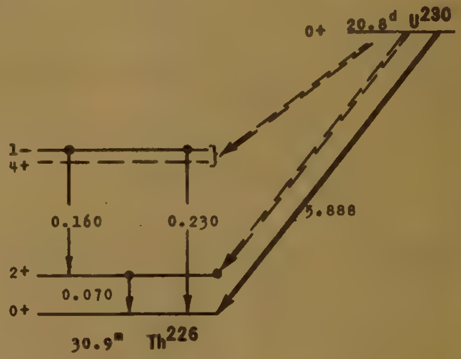
$(0.91\ \gamma)(0.25\ \gamma)/(0.91\ \gamma)(0.76\ \gamma) \sim 1$
†Transitions per 100 Th^{234} disintegrations

S.A.E.Johansson, Phys. Rev. 96, 1075 (1954).

U^{230}
92 138
20.8^d

α	5.888	scin
γ	0.070	scin
	0.160	
	0.230	

$(5.66\ \alpha)(0.160\ \gamma)(\theta)$ Isotropic*
$(5.66\ \alpha)(0.230\ \gamma)(\theta)$ J = 0, 1, 0
$(5.82\ \alpha)(0.070\ \gamma)(\theta)$ J = 0, 2, 0
*0.230 level interpreted as 4+, 1- doublet



F.Stephens, Jr., F.Asaro, I.Perlman, Phys. Rev. 96, 1568 (1954).

U^{236}
92 144
2.39×10^{7y}
Resonances $U^{(235)}$(n, f) E_n = 0.01 to 0.4 ev
~-0.7 ev if $\Gamma_f^2 \sim 0.3$ cryst
~+0.28

D.Popović, J. Nuclear Energy 1, 3, 170 (1954).

U^{239}
92 147
23.5^m
Resonances $U^{(238)}$(n) E_n = 3 to 700 ev

σ_o (10³b)	E_o (ev)	Γ (10^{-3}ev)	Γ_γ (10^{-3}ev)
23 ± 3	6.70 *6*	25.5 ± 2.0	24 ± 2
31 ± 6	20.9 *2*	33 ± 5	25 ± 5
37 ± 8	37.0 *3*	61 ± 7	29 ± 9
24 ± 10	66.5 *7*	44 ± 10	17 ± 10
	81.6	166	278
	90	192	297
	104	212	368
	118	242	418
	146	258	

R.S.Carter, Phys. Rev. 98 (1955).
BAPS 30, #1, (New York), HA5; verbal report.

Np^{234} 93 141 4.4^d

U^{235}(19-Mev d,3n) chem scin

γ 50† $\left\{\begin{matrix}(0.76)\\(0.81)\end{matrix}\right\}$ unresolved

40† 1.57

100† K x ray

70† L x ray

$\epsilon_K/\epsilon_L \sim 1.0$

R.W.Hoff, UCRL-2325 (1953).

Np^{235} 93 142 410^d

No γ observed

R.W.Hoff, S.G.Thompson, Phys. Rev. 96, 1350 (1954).

Np^{236} 93 143 22^h

U^{235}(12-Mev d,n) chem

$\epsilon_K/\beta^- = 43/57$ from (K x ray)/(Pu^{236} α) scin

No 0.150 γ

H.Jaffe, UCRL-2537 (1954).

Np^{236} 93 143 $> 5000^y$

U^{238}(21.6-Mev d,4n) chem ms

τ_β $> 5000^y$

σ(n,f) = 2800

No α's observed other than Np^{237} α's ic

M.H.Studier, J.E.Gindler, C.M.Stevens, Phys. Rev. 97, 88 (1955).

Np^{237} 93 144 $2.2X10^{6y}$

g for 0.060 level = 1.4 ± 0.2 $\alpha\gamma(\theta,H)$

V.E.Krohn, T.B.Novey, S.Raboy, Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), S10; verbal report.

Np^{238} 93 145 2.1^d

No U L_I x ray (<4%) cryst

H.Jaffe, UCRL-2537 (1954).

Resonances Np^{237}(n) E_n = 0.02 to 3 ev

0.489 ev σ_o = 2600 Γ = 0.032

1.34 $\sigma_o\Gamma \sim 29$ cryst

1.49 $\sigma_o\Gamma \sim 140$

M.S.Smith, R.R.Smith, E.G.Jokl, J.E.Evans, Phys. Rev. 99 (1955);
BAPS 30, #3 (Washington), 86 (1955).

Np^{239} 93 146 2.33^d

J 1/2 S

J.G.Conway, R.D.McLaughlin, Phys. Rev. 96, 541 (1954).

$U^{(238)}$(pile n) chem cryst

γ 5† 0.0576 *3*

25† 0.0618 *3*

H.Jaffe, UCRL-2537 (1954).

Pu^{234} 94 140 9^h

No γ (< 0.5%) U^{233}(36-Mev α,3n) scin

R.W.Hoff, UCRL-2325 (1953).

Pu^{237} 94 143 40^d

τ 40^d U^{235}(36-Mev α,2n) chem

Np^{237}(9.5-Mev p,n) chem

γ 39† ~0.064 ($\alpha_L \sim 1.1$) scin

x 100† K x ray

77† L x ray

ϵ(0.060 level)/ϵ(g.s.) = 0.56

R.W.Hoff, UCRL-2325 (1953).

Pu^{238} 94 144 90^y

γ 0.0436 *3* $L_2, L_3 > L_1$* E2 s ce

$\tau < 5\times10^{-10}$s

0.1000 *4* $L_2, L_3 > L_1$* E2

E.L.Church, A.W.Sunyar, Phys. Rev. 98 (1955).
BAPS 30, #1 (New York), S5; *verbal report.

γ (0.0438) α_{L_2} = 420* cryst

α_{L_3} = 170*

*Using (3.8×10^{-4} 0.0438 photons)/α

H.Jaffe, UCRL- 2537 (1954).

Pu^{240} 94 146 6580^y

Resonance Pu^{239}(n,f) E_n = 0.008 to 10 ev

0.298 *2* ev Γ = 0.08ev

σ suggests negative energy resonance also

M.Galula, B.Jacrot, F.Netter, Compt. rend. 239, 1128 (1954).

Resonance Pu^{239}(n,f) E_n = 0.01 to 0.95 ev

0.300 *5* ev Γ = 0.09ev cryst

G.Vendryes, P.Hubert, J.M.Auclair, Compt. rend. 239, 1034 (1954).

Am^{240} 95 145 47^h

τ 47^h *2*

γ 14† 0.92 *3* scin

70† 1.02 *2*

15† 1.40 *3*

R.A.Glass, UCRL-2560 (1954).

Am^{241} 95 146 470^y

No 5.546 α s

F.Asaro, I.Perlman, Phys. Rev. 93, 1423 (1954).

γ (0.060) dipole $\alpha,\gamma(\theta)$

T.B.Novey, Phys. Rev. 96, 547 (1954).

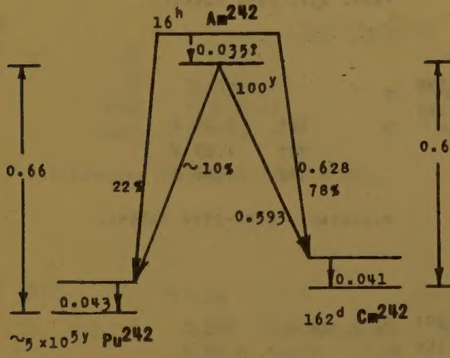
Am^{241} γ 330† 0.02636 *1* cryst
95 146 20† 0.03320 *2*
470^{y} 24† 0.04346 *9*
(4000†) 0.05957 *2*
4† 0.103 *2* 0.08† 0.210 *5* scin
0.3† 0.113 *5* 0.01† 0.270 *10*
0.5† 0.130 *4* 0.03† 0.328 *10*
0.04† 0.159 *10* 0.02† 0.370 *10*
No 0.056 γ, 0.070 γ, (< 1†) cryst
†Photons per 10^4 α's

P.P.Day, Phys. Rev. 97, 689 (1955).

γ 400† 0.02638 *4* cryst, sd ce
$\alpha < 5.5$ E1
<100† 0.0332 *1* sd ce
<100† 0.0434 *2* sd ce
0.056 sd ce_{L_3}
(4000†) 0.05962 *6* cryst, sd ce
$\alpha = 0.9$ $\alpha_L = 0.7$
L_1L_2/L_3 ~4.4 E1?
6† 0.0995 *10* scin, sd ce
L_2/L_3 ~1.7 E2
0.6† 0.128 scin
vw 0.168 ? scin
vw 0.207 ? scin
(0.0596 γ)(0.0995 γ)*
†Photons per 10^4 α's

H.Jaffe, T.O.Passell, C.I.Browne, I.Perlman, Phys. Rev. 97, 142 (1955); *F.S.Stephens, Jr., Ibid.

Am^{242} β^- 0.628 Am^{241}(pile n,γ) sd
95 147 γ 0.041 *2* $\alpha_L > 200$ cryst, sd ce
16.0^{h} $L_2 : L_3 : M_2 : M_3 : N = 100 : 74 : 67 : 44 : < 22$
0.043 *2* $\alpha_L > 200$
$L_2 : L_3 = 59 : 23$
IT < 5% from L x ray intensities cryst
$\beta^-/\epsilon = 3.6$ from L x ray intensities
ϵ_K/ϵ_L ~0.7 scin, cryst



R.W.Hoff, UCRL-2325 (1953).

Am^{241}(pile n,γ) chem
γ 7† 0.0423 *2* $\alpha_L = 500$ cryst
6† 0.0448 *2* $\alpha_L = 200$
IT ≤ 6% (from L x ray intensities)

H.Jaffe, UCRL-2537 (1954).

Am^{242} ϵ_K ~10% Am^{241}(pile n,γ)
95 147
100^{y} H.Jaffe, UCRL-2537 (1954).

Cm^{241} Pu^{239}(27-Mev α,2n) chem
96 145 α 5.95 *2* ic
35^{d} γ w 0.065 ? 28† 0.47 *1* scin
w 0.163 ? 7† 0.59 *1*
$\alpha/\epsilon = 0.007$ from Am^{241} growth and α counts
†Photons per 100 disintegrations

R.A.Glass, UCRL-2560 (1954).

Bk^{243} τ 4.5^{h} *1* Cm^{242}(16-Mev d,n) chem
97 146 α ~0.15%
4.5^{h} γ 0.07 scin
0.22
Higher energy γ's observed
All γ's may belong to Bk^{244}

E.K.Hulet, UCRL-2283 (1953).

Bk^{244} τ $\sim 4.5^{h}$ Am^{241}(33-Mev α,n) chem
97 147 γ 0.07 scin
$\sim 4.5^{h}$ 0.22
Higher energy γ's observed
All γ's may belong to Bk^{243}

E.K.Hulet, UCRL-2283 (1953).

Bk^{249} τ 290^{d} *20* Pu(pile n) chem
97 152 α $\sim 10^{-3}$% 5.40 *5* ic
290^{d} β^- 0.08 *2* a
τ for spontaneous fission $\geq 2 \times 10^{8y}$

L.B.Magnusson, M.H.Studier, P.R.Fields, C.M.Stevens, J.F.Mech, A.M.Friedman, H.Diamond J.R.Huizenga, Phys. Rev. 96, 1576 (1954); 94, 1083 (1954).

Cf^{246} τ for spontaneous fission $= 2.1 \times 10^{3y}$
98 148
1.5^{d} E.K.Hulet, UCRL-2283; quoted by P.R.Fields, et al. Nature 174, 265 (1954).

γ ~0.043 α(ce) ppl

D.C.Dunlavey, G.T.Seaborg, quoted by R.W.Hoff, UCRL-2325 (1953).

Cf^{249} τ 470^{y} *100* d 290^{d}Bk chem, ms
98 151 α 5.81 *3* ic
$\sim 470^{y}$ No other α (< 5% of 5.81 α)
τ for spontaneous fission $\geq 5 \times 10^{6y}$

L.B.Magnusson, M.H.Studier, P.R.Fields, C.M.Stevens, J.F.Mech, A.M.Friedman, H.Diamond, J.R.Huizenga, Phys. Rev. 96, 1576 (1954); 94, 1083 (1954).

Cf^{250} Bk^{249}(pile n) chem, ms
98 152 τ 10.0^y *2.4*
10^y
α 10% 5.99 *1* lc
90% 6.03 *1*
(5.99 α)(L x ray) No (6.03 α)(L x ray)
τ for spontaneous fission $\sim 1.5\times10^{4y}$

L.B.Magnusson, M.H.Studier, P.R.Fields, C.M.Stevens, J.F.Mech, A.M.Friedman, H.Diamond J.R.Huizenga, Phys. Rev. 96, 1576 (1954); 94, 1083 (1954).

Cf^{251} τ_β $\gg 18^d$ Pu(pile n) chem, ms
98 153 No α's observed lc
$>18^d$

L.B.Magnusson, M.H.Studier, P.R.Fields, C.M.Stevens, J.F.Mech, A.M.Friedman, H.Diamond J.R.Huizenga, Phys. Rev. 96, 1576 (1954).

Cf^{252} τ 2.2^y *2* Pu(pile n) chem, ms
98 154
2.2^y α 10† 6.08 *1*
90† 6.12 *1*
(6.08 α)(L x ray) No (6.12 α)(L x ray)
τ for spontaneous fission $\sim 66^y$

L.B.Magnusson, M.H.Studier, P.R.Fields, C.M.Stevens, J.F.Mech, A.M.Friedman, H.Diamond, J.R.Huizenga, Phys. Rev. 96, 1576 (1954); 94, 1083 (1954).

Cf^{253} τ 18^d *3* Pu(pile n) chem
98 155 β^- D 19^d 99
18^d

L.B.Magnusson, M.H.Studier, P.R.Fields, C.M.Stevens, J.F.Mech, A.M.Friedman, H.Diamond, J.R.Huizenga, Phys. Rev. 96, 1576 (1954); 94, 1083 (1954).